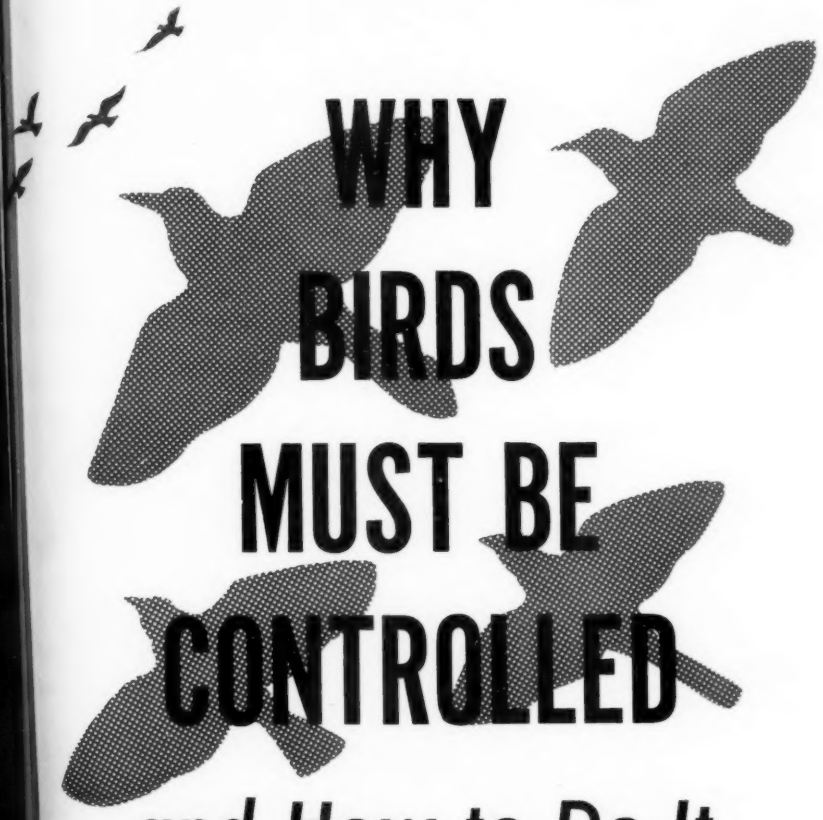
PEST CONTROL

SEPTEMBER 1961



WHY BIRDS MUST BE CONTROLLED

and How to Do It

CDC details the health hazards of birds and diseases they carry, in an article on page 9

Purdue lesson is about birds and other vertebrates beginning page 29

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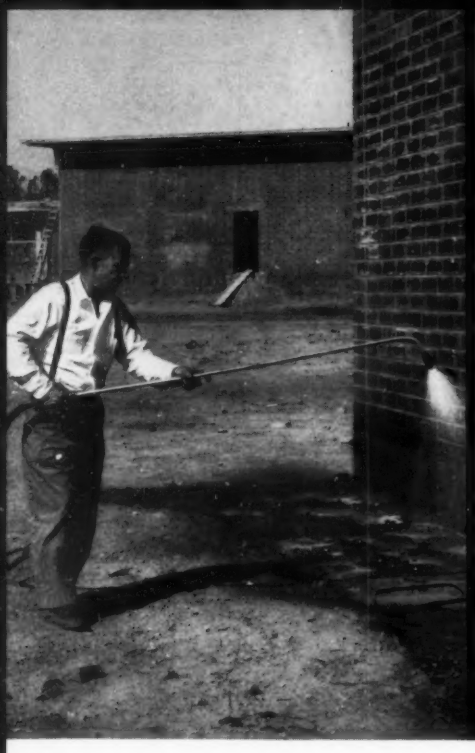

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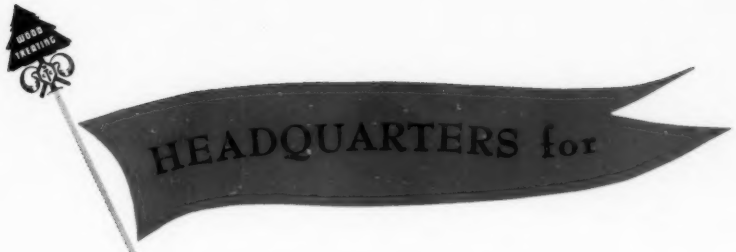

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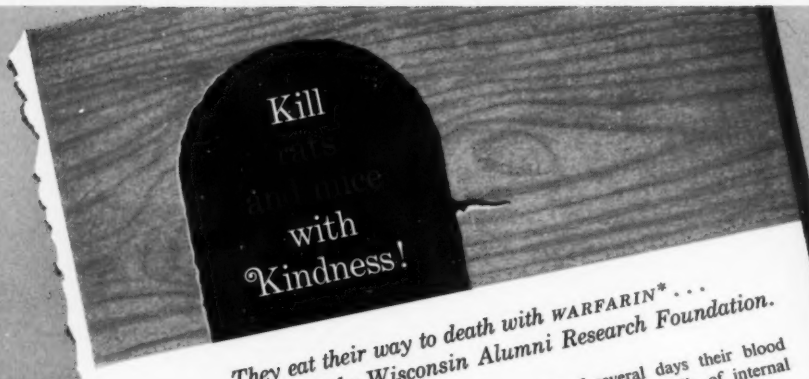

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A little more than 10 years ago WARFARIN was hailed as a dramatic new discovery that revolutionized the extermination of rats and mice. Since then WARFARIN has proved itself to be the safest rodenticide known, and its name has become a household word throughout the world.

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PEST CONTROL

September, 1961 — No. 9 Volume 29

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"Double-Talk" Benefits Phone Companies

Over twenty years have passed since this industry decided to toss out the term "exterminator" and replace it with the more realistic "pest control operator." Yet, there are still the die-hards who have been unwilling to make the change. The evolution from one name to another hasn't been as quick as it might have been, however, because an important public utility has refused to recognize the majority wishes. Besides, it profits by continuing the multiple label system.

Telephone companies can sell double listings in their classified sections as long as they can keep alive the idea that the general public might look first under "Exterminator" in the Yellow Pages. This could simply be resolved when the directories are printed by merely making a cross-reference to "Pest Control Operators." Perhaps this is too obvious.

An effort was made this year to poll the pest control industry for its opinion regarding this use of double terms. Telephone companies made surveys, and we are chagrined to learn that the response of many was mere indifference, even though the two-name system costs the telephone subscriber twice as much. We'll bet that if these same PCOs had to decide between paying a penny a gallon more for one brand of chemical than they would for another, they'd choose the cheaper brand. Yet, these added directory listing charges appear on their phone bill month after month and are paid without question. Actually the money could be spent more profitably on better formulations.

Regardless of the outcome of present phone company surveys, the issue is not dead. We would like to see an industry-wide committee established now to do the ground work far enough in advance so there can be uniformity in the listings for this industry under "Pest Control Operators" in all the telephone classified directories in our land. The NPCA convention next month would be a good place to start the ball rolling again.

Letters

Source for TMTD, TNBA, ZAC

Last month you ran an excellent article on squirrels by Mr. John C. Jones (page 14). In it he mentions three repellents, TMTD, TNBA, and ZAC. Can you tell me where these can be purchased?

Jack Appleberry
Garrettsville, Ohio

The chief manufacturing source for TMTD is the Grasseli Chemical Department, E. I. duPont de Nemours & Co., Wilmington, Dela.; for TNBA and ZAC, Panogen Chemical Div., Morton Chemical Co., 110 North Wacker Drive, Chicago 6, Ill. TMTD is distributed under several trade names: Magic Circle Rabbit Repellent by J. C. Ehrlich Chemical Co., Reading, Pa.; Selco TMTD-Rhoplex by Selco Supply Co., Eaton, Colo.; TAT-GO by O. E. Linck Co., Inc., Clifton, N. J. For TNBA, Ringwood Rabbit Repellent is sold by Medical Service Corp., Chicago, Ill. ZAC is available in liquid form as Improved Z.I.P. from Panogen, and in powder as No Nib'l from Hydroponic Chemical Co., Copley, Ohio. Editor.

Good Bat Specimen

At the time of preparation of the pictorial key to bats of United States genera, which accompanied my article on bats in the August issue of *Pest Control*, page 23, no un-mutilated specimen of *Idionycteris* was known and no adequate description of its face had ever been written. Therefore, we drew a face based upon what little information was available. A good

Idionycteris
ALLEN BATS

specimen of this bat has just become available and I am enclosing a revised picture of its face. (See illustration.) Readers could clip this new version out and paste it over the old one in the key that appeared in August.

Harold George Scott
Insect & Rodent Control Training Section
Communicable Disease Center
Atlanta, Georgia

Disallowed Termite Warranties

In your June issue, page 46b, you mentioned the Tax Court refused to allow a termite control firm to exclude as prepaid income the costs connected with a 5-year warranty it had given on its jobs. Can you tell me where I can find out more information on this?

Jack Bingham
Sierra Termite Control
Mesa, Arizona

In answer to your question, please refer to Tax Court decision in L. L. Crosby *(35 TC #83, 2/9/61).* Editor.

Pest Control welcomes expressions of opinions from its readers. Send ideas and comments briefly as possible to James A. Nelson, Editor, Pest Control, 1900 Euclid Ave. Cleveland 15, Ohio.

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Roach Egg Capsules Switched

On page 21 of your June '61 issue, the first page of Lesson 6 in the Purdue Correspondence Course, there is a key to egg capsules of some common roaches. I believe the illustrations are switched under reference 4, showing the differences between Oriental and American cockroach capsules. The capsule of the American roach is smaller than the one of the Oriental roach.

Robert M. Russell

Atlanta, Georgia

Reader Russell is correct. Despite the fact that page proofs of these lessons are read by three different people and by trained entomologists, such errors manage to slip by. We are happy to have such mistakes brought to our attention so corrections can be made. Egg capsules of these two roaches are correctly illustrated below. We suggest you mark this correction on page 21 *of your copy of our June issue.* Editor.

4)* **With 8 eggs on each side.....**

Oriental cockroach

or

American cockroach

July Issue Kudos

I want to give you my compliments on the July issue. In a couple of places in this number the recommendation is made that "All safety equipment and supplies should have approval of the Mine Safety Board, U.S. Bureau of Mines." Safety equipment and supplies is a rather inclusive statement and doesn't just cover gas mask equipment. As you know the U.S. Bureau of Mines does not approve such things as safety belts, hand lines, and many of the detectors, etc.

G. M. Glidden

General Manager
Acme Protection Equipment Co.
South Haven, Michigan

I want to thank you for my last copy of *Pest Control* magazine which just arrived on fumigation. I was just in the midst of trying to get information for a job on drywood termites in one of our Mission houses. It has been very helpful indeed.

Robert F. Gipe

Church Building Consultant
United Church of Christ in the Philippines
Baguio City

Starling Importer Revealed

Please accept my congratulations on the excellent standard of your magazine, *Pest Control*. From time to time it comes my way and I always find it of exceptional interest. I have just read the October '60 issue and, on page 20, it states that your starling problem was started by an "unidentified bird lover." Somewhere or other I have read that he was by no means annonymous. He is said to have been a Mr. Schieffelin, a New York businessman who was keen on Shakespeare and also on bird watching. He tried to bring into America any birds which are mentioned in Shakespeare's plays, but none of them survived except the starlings. These birds in due time became either a problem, a challenge, or an opportunity (whichever way you look at it) for your PCOs.

E. C. Parris

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Easy-to-use Larvacide gas finds, kills all rats, mice fast . . . no bait . . . no uncertainty. Fumigate for a few minutes Friday night . . . air out rodent-free premises Monday morning.
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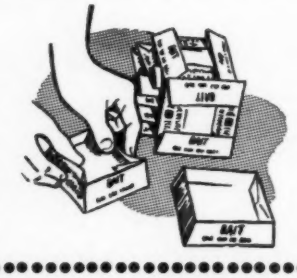
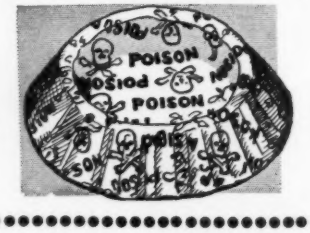


RAT JIGGER

1M	$6.75
5M or more	$5.62 per M
25M or more	$5.17 per M



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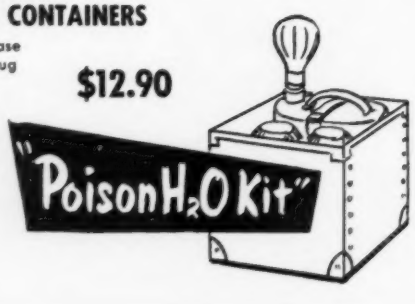

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50 packets to carton

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2 cartons	**9.50/ctn.**
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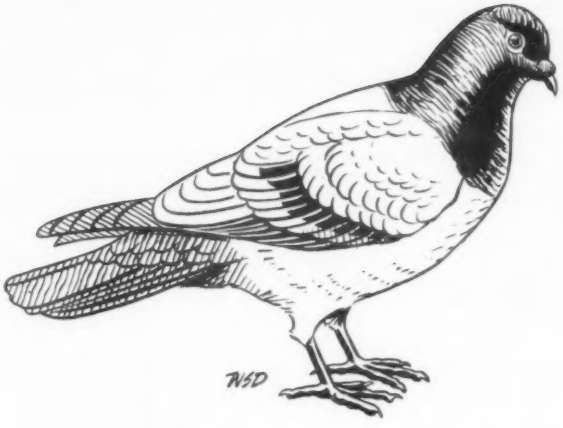

PIGEONS

Public Health Importance and Control

By

DR. HAROLD GEORGE SCOTT

Training Branch
Communicable Disease Center
U. S. Department of Health, Education, and Welfare
Atlanta, Georgia

THE COMMON PIGEON, *Columba livia*, developed from the European rock dove, was introduced as a domestic bird into North America. It is recorded as a domestic bird in Egypt as early as 3,000 B. C., and was undoubtedly domesticated long before this time. It harbors in the ornate architecture of large buildings and subsists on food provided by the insanitary habits and good will of man (Levi, 1957; Scott, 1959).

Life History

Pigeons are monogamous. Eight to 12 days after mating the female lays 1 to 2 eggs (6 to 9 days in captivity). The male cares for and guards the female and nest. About 18 days after laying, the eggs hatch. The squabs are fed predigested food ("pigeon milk") which gradually thickens until the mature young are weaned just before leaving the nest at 4 to 6 weeks. More eggs are laid before the first young are weaned. Breeding occurs at all seasons.

A population of pigeons will consist almost equally of males and females. The largest of pigeons weighs about 3½ pounds and has a wing span of 36 inches. Most are smaller than this. Pigeons commonly live 15 years, occasionally 30 or more.

The diet of pigeons consists of seeds, grain, some fruit, some green feed, and sufficient grit for proper digestion. An adult pigeon consumes about one pound of food per week (Kalkowski, 1958; Buchka, 1958).

Beneficial Aspects

Pigeons are kept as pets (marked by leg bands). Most Americans regard them with benevolence and pigeons afford pleasurable recreation to large numbers of people in city parks and through pigeon breeding and racing "clubs." Pigeons fly as far as 300 miles in one day and come home after being removed 600 miles (the world homing pigeon record is 3,000 miles).

They are excellent scavengers and aid significantly in keeping city streets clean.

Pigeonpox virus is used for immunizing laying hens against chickenpox (Schurmann, 1958; Gerriets, 1958).

Pigeons ("squabs") are considered a food delicacy (over one million pounds marketed each year in the U. S.) (Levi, 1943; Roberts, 1956; USDA, 1960).

For centuries homing pigeons have been used as messengers, and pigeons are widely used as laboratory animals (especially in heart disease studies since pigeons are one of the few animals developing spontaneous atherosclerosis).

Pigeons are easily trained and are often used in night club and theater acts (Reid, 1958). In some parts of the world they are raised for targets in pigeon shoots. Pigeon droppings are used for garden manure and formerly were used for tanning leather.

Economic Problem

Pigeon droppings deface and accelerate deterioration of buildings, statues, and automobiles, and may be deposited on unwary pedestrians. Large amounts of pigeon excrement may kill lawns and shrubbery. In addition, pigeon droppings, regurgitated pellets, feathers, and nesting material are common contaminants of grain destined for use as human food. Pigeon nests clog drain pipes, mar window sills, interfere with awnings, and render fire escapes hazardous.

Pigeon noise irritates many people, and pigeon manure produces objectionable odors. Large flocks of pigeons represent a hazard to aircraft.

Pigeons may "steal" bright (and often valuable) articles. For example, a pigeon recently stole a $7,000 diamond ring in New York City.

Pigeons around grain-handling

Dr. Scott teaches CDC pest control courses.

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DIPHACIN 1/10 . . . Resists insects and is mold resistant . . . keeps attractive longer.

DIPHACIN 1/10 . . . Is packed in containers of 5 lbs. @ $1.25, 25 lbs. @ $1.15 and 100 lbs. @ 95c in 1/10% concentration, lowest concentration of all anticoagulants. One pound mixes with 19 lbs. of your formula to make 20 lbs. of ready mixed bait.

DIPHACIN 1/10 . . . Newest and most effective weapon we can employ in our "War on Rodents".

DIPHACIN 1/10 . . . Has been tested by United States Fish & Wildlife Service and United Kingdom Ministry of Agriculture, Fisheries and Food.

See your Distributor today about your requirements.
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Diphacin 1/10 is:

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Inert ingredients	99.9%
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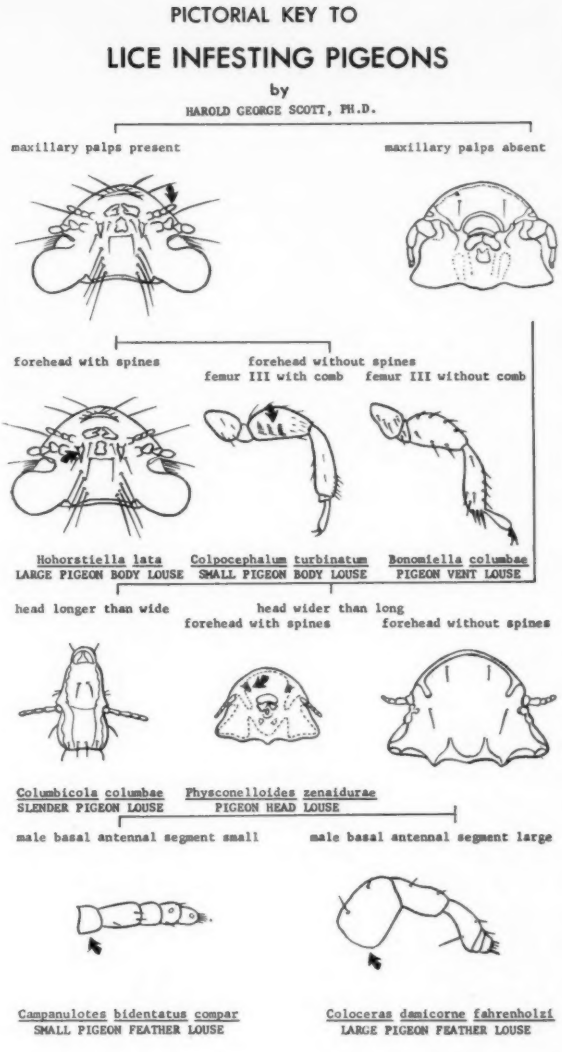

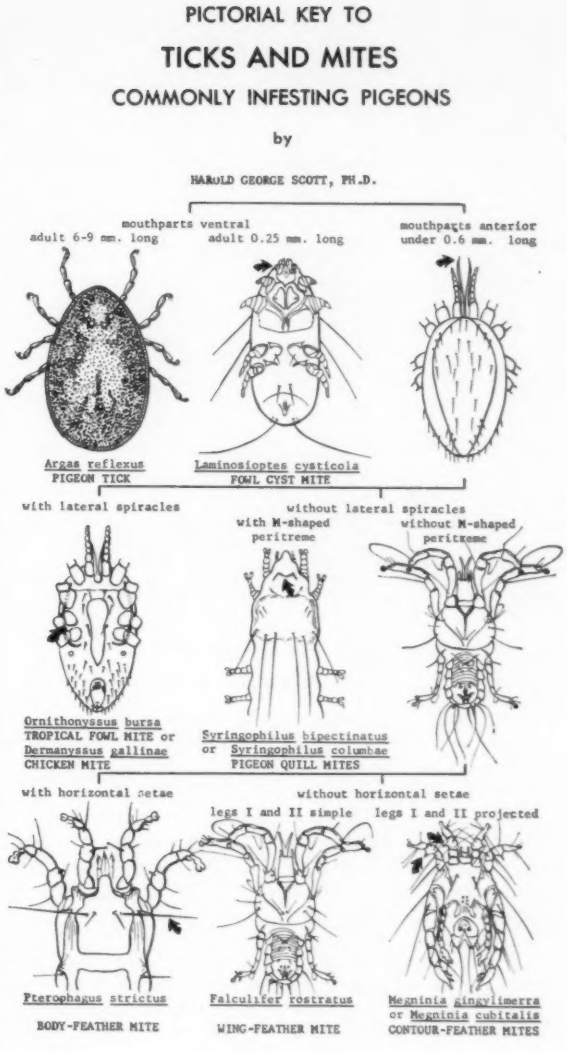

establishments may consume and contaminate tremendous quantities of food (Abarbanel, 1959). Presence of pigeons greatly increases the cost of maintenance of commercial and public buildings and their environs. Feral pigeons are a constant disease threat to domestic pigeons.

Pigeon-Borne Diseases

The public health hazard of pigeons should be carefully balanced against the cost of an extensive control program. In the absence of human disease outbreaks demonstrably associated with pigeons, control should be directed against excessive concentrations of the birds rather than against the entire pigeon population.

Pigeon Ornithosis, a psittacosis-like virus disease transmitted by infected pigeon droppings or respiratory droplets, may be transmitted to man (Inaba, *et al.*, 1958; Galton and Arnstein, 1960). Transmission also occurs from man to man and human carriers have been detected. The disease is usually mild in man, and may be common in man in localized areas (Terzin, *et al.*, 1957). Surveys show that as much as 30-75% of the pigeon population may be infected (Recht, 1955), even though only a few of the birds are obviously ill. In Oslo (Norway), 11.5% of patients hospitalized for virus pneumonia and 3.6% of blood donors tested showed a positive complement-fixation titre for ornithosis (Lerche, 1958; Meyer, 1959; Sorensen, 1955).

Encephalitis, a series of virus diseases involving the central nervous system, is transmitted from birds to man by mosquitoes (Blackmore and Dow, 1958). Pigeons are known to be carriers of encephalitis viruses, but their exact role in the epidemiology of these diseases is as yet unknown (Winn, Palmer, and Kaplan, 1957; Fothergill and Dingle, 1938). Kissling (1958) suggests that surveillance for encephalitis in pigeons might give warning of incipient epidemics in man and horses.

Newcastle Disease, a highly contagious and fatal virus neuro-pneumonia of birds including pigeons, has been recognized in man, but is extremely rare. Chickens and turkeys, rather than pigeons are probably the source of most human infections. Transmission is thought to be by (1) respiratory droplets, or (2) ectoparasites (USPHS, 1957).

Aspergillosis, a fungus disease of the human ear, sinuses, lungs, or

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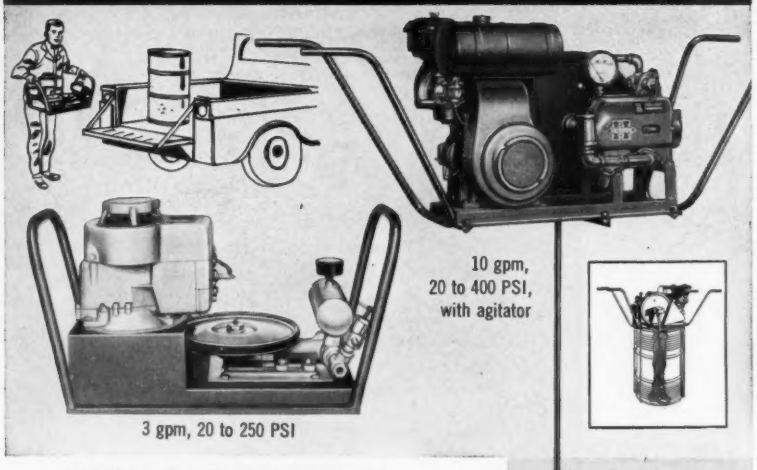
PORTA-POWER* SPRAY PUMPS



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skin caused by *Aspergillus fumigatus*, is common in pigeons. This fungus is so ubiquitous, pigeons are not considered significant sources of human infection.

Thrush, a fungus infection of the mouth, respiratory system, vagina, skin, or fingernails of man caused by *Candida albicans*, can cause high mortality in pigeon flocks, particulary in young birds. This fungus is so ubiquitous, pigeons are not considered significant sources of human infection.

Histoplasmosis, a systemic fungus disease of man, may be contracted while cleaning up accumulations of dusty pigeon manure containing *Histoplasma capsulatum*. The pigeons may or may not have histoplasmosis (Schwarz, *et al.*, 1957). Regardless, dusty pigeon manure is a suitable medium for development of the air-borne spores (Anonymous, 1958). In a Kansas study (Furcolow and Ney, 1957), children living in buildings on which pigeons roosted or nested had an infection rate (based upon histoplasmin sensitivity) 3 times that of children living in quarters without pigeons. Numerous carefully documented accounts of histoplasmosis epidemics associated with pigeons have been published (Parrott, *et al.*, 1955; Sabin, 1956; Grayston and Furcolow, 1956). A sample of 25,000 persons from 48 states showed 24% with positive histoplasmin sensitivity (Zeidberg, 1956; USPHS, 1956).

Cryptococcosis, a systemic fungus infection of man caused by *Cryptococcus neoformans*, has been found associated with pigeon manure (Littman and Schneierson, 1959; Kaeo and Schwarz, 1957; Fazekas and Schwarz, 1958; Ajello, 1958) in the same way as histoplasmosis. In addition, the fungus can survive for a time in pigeon tissues, and this may be a possible source from which the fungus is implanted in the soil (Schwarz, *et al.*, 1957; Emmons, 1955).

Toxoplasmosis, a protozoal disease of man and other animals caused by *Toxoplasma gondi*, is frequently found in pigeons. Actual mode of transmission is unknown but it is considered to be via (1) respiratory droplets, (2) fecal contamination, (3) contact with in-

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Controls resistant strains
While malathion is replacing less effective insecticides in all areas, it is particularly useful in the many areas where mosquitoes have become resistant to chlorinated insecticides. Here, authorities have switched almost exclusively to malathion because it is *the* phosphate with low toxicity to warm-blooded animals. The U.S. Public Health Service reports that malathion is actually less toxic than DDT. Vector control authorities, park and city managements are specifying malathion for its combination of mosquito-killing power and safety in use. It can be applied by air, thermal fogging and mist spraying with equally good results.

Formulations widely available
Malathion formulations are supplied to area control authorities by many well-known manufacturers under their own brand names. *Write to American Cyanamid Company,* maker of technical malathion, for detailed information on area mosquito control. American Cyanamid Company, Agricultural Division, Princeton, New Jersey.

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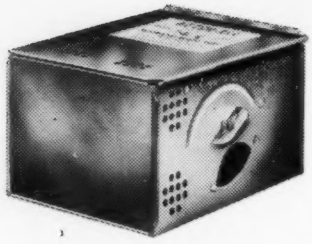

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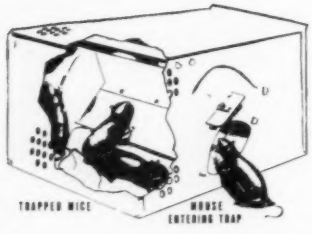

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fected tissues, or (4) ectoparasites. Transmission probably occurs from pigeon to man. A carefully documented outbreak of toxoplasmosis is to be found in Gibson and Eyles, 1957.

Pseudotuberculosis, a bacterial disease (*Pasturella pseudotuberculosis*) of the internal organs of many animals, rarely infects man. Many pigeons have this disease. Mode of transmission is unproven but is thought to be through soil, dust, water, milk, food, or some ectoparasite.

Avian Tuberculosis, a bacterial disease caused by *Mycobacterium tuberculosis* var. *avian* (a close relative to the human tubercle bacillus) is moderately common in pigeons, but human infection is believed to be rare (Feldman, 1947).

Salmonellosis, a bacterial food poisoning, is a common human disease. *Salmonella typhimurium,* found in about 2% of pigeon feces, is statistically the most frequent cause of salmonella food poisoning in man. Pigeons may be involved in transmission of this disease to man (Jacob, 1957; Das. *et al.*, '59).

Pigeon Coccidiosis, caused by the protozoan *Eimeria labbeana* and transmitted via contaminated food and water, produces much fatality among pigeons. At any given time from 10-90% of the pigeons have this disease (Zavadil, 1958). It is apparently not transmissible to man. *Pigeonpox,* a widespread virus disease of pigeons is also not transmissible to man. It is believed to be transmitted from pigeon to pigeon mechanically or by mosquitoes (Lee, 1958; Bol, 1959; Nazarov, 1958).

Food Contamination by pigeon droppings is an important economic and public health problem (Harris, 1959). Often workers do not notice the birds because they roost high up in buildings, or roost only at night, leaving when workers arrive in the morning. About 4% of all U. S. wheat is contaminated by bird droppings.

Domestic Flies may breed in pigeon excrement, pigeon nests, and dead pigeons. If pigeon populations are large, these may become major sources of flies.

Pigeon Ectoparasites (bugs, fleas, ticks, and mites) may bite man. They frequently invade homes from pigeon nests in or on the building (Rand, 1959). The following ectoparasites are those most commonly associated with the domestic pigeon:

MALLOPHAGA (chewing lice) (do not bite man) (see pictorial key for all known species of pigeon lice) (Emerson, 1957; Rakspahl, 1959).

HEMIPTERA (bed or nest bugs):
Pigeon Nest Bug (*Cimex columbarius*) (may bite man, but does not transmit human disease).

HEMIPTERA (kissing bugs):
Pigeon Kissing Bug (*Triatoma rubrofasciata*) (bites man, transmits Chagas disease).

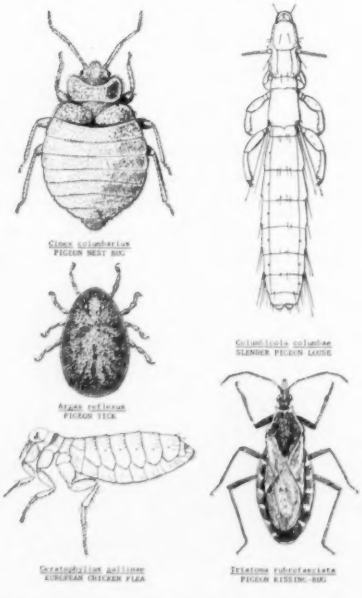
DIPTERA (louse flies):
Pigeon Louse Fly (*Pseudolynchia canariensis*) (may bite man, but transmits no human disease).
A Bird Louse Fly (*Ornithomyia avicularia*) (not reported biting man).

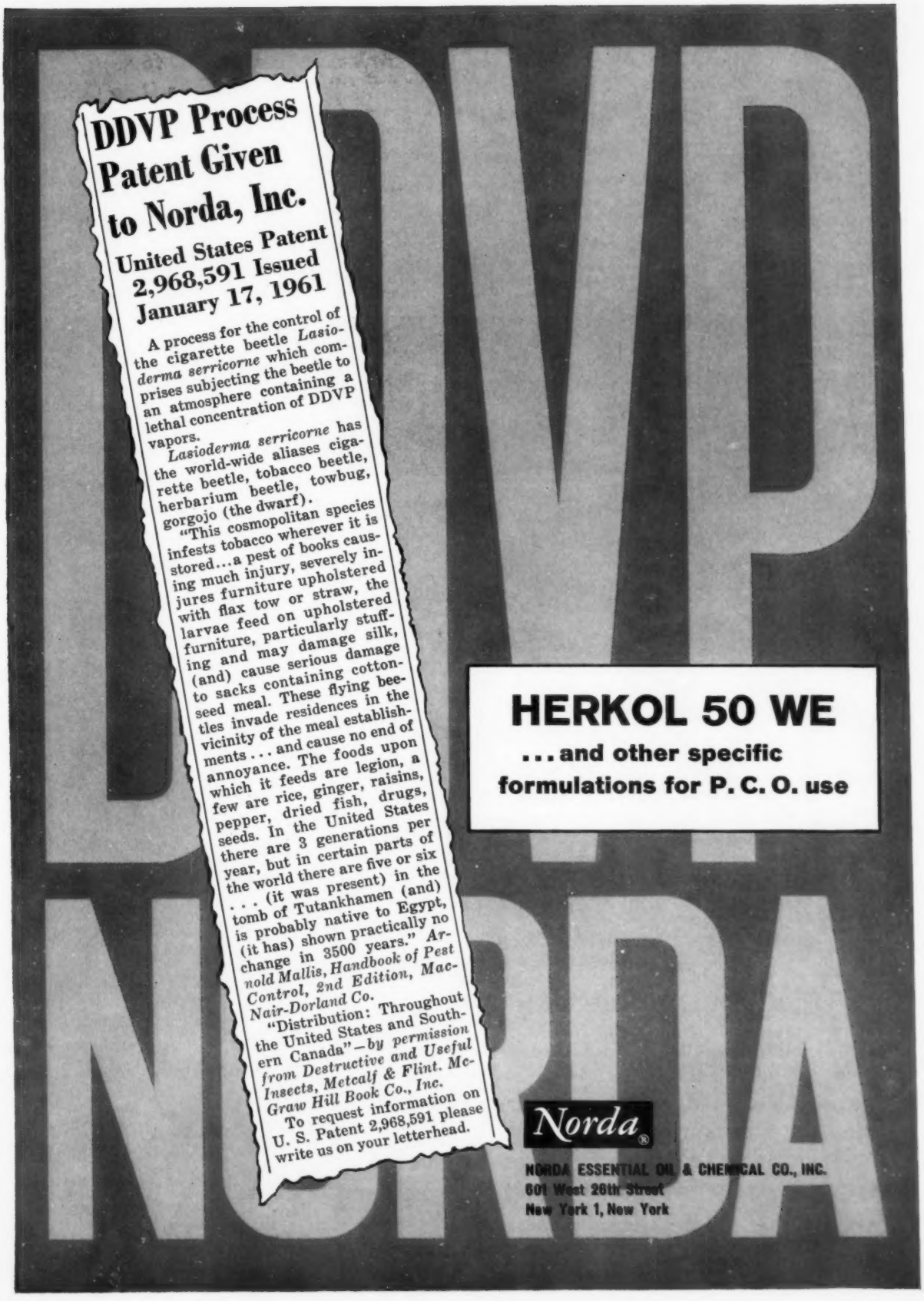
SIPHONAPTERA (fleas):
Pigeon Flea (*Ceratophyllus columbae*) (may bite man, not known to transmit human disease).
European Chicken Flea (*Ceratophyllus gallinae*) (may bite man, not known to transmit human disease).

ACARINA (soft ticks):
Pigeon Tick (*Argas reflexus*) (may bite man, not known to transmit disease).

ACARINA (mites: (Baker, *et al.*, 1956; Sasa and Shingae, 1958).
Chicken Mite (*Dermanyssus gallinae*) (may cause epidemic dermatitis in man (Deoreo, 1958), has been found infected with eastern, St. Louis, and western encephalitis virus (Sulkin, 1945; Smith, *et al.*, 1944).
Wing-Feather Mite (*Falculifer rostratus*) (does not bite man).
Fowl Cyst Mite (*Laminosioptes cysticola*) (internal parasite of pigeons; not known to attack man).
A Contour-Feather Mite (*Megninia cubitalis*) (does not bite man).
A Contour-Feather Mite (*Megninia ginglymerra*) (does not bite man).
Tropical Fowl Mite (*Ornithonyssus bursa*) (may bite man, has been found infected with encephalitis).
Northern Fowl Mite (*Ornithonyssus*

REPRESENTATIVE PIGEON ECTOPARASITES

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DDVP Process Patent Given to Norda, Inc.
United States Patent 2,968,591 Issued January 17, 1961
A process for the control of the cigarette beetle Lasioderma serricorne which comprises subjecting the beetle to an atmosphere containing a lethal concentration of DDVP vapors.
Lasioderma serricorne has the world-wide aliases cigarette beetle, tobacco beetle, herbarium beetle, towbug, gorgojo (the dwarf).
"This cosmopolitan species infests tobacco wherever it is stored...a pest of books causing much injury, severely injures furniture upholstered with flax tow or straw, the larvae feed on upholstered furniture, particularly stuffing and may damage silk, (and) cause serious damage to sacks containing cottonseed meal. These flying beetles invade residences in the vicinity of the meal establishments . . . and cause no end of annoyance. The foods upon which it feeds are legion, a few are rice, ginger, raisins, pepper, dried fish, drugs, seeds. In the United States there are 3 generations per year, but in certain parts of the world there are five or six . . . (it was present) in the tomb of Tutankhamen (and) is probably native to Egypt, (it has) shown practically no change in 3500 years." Arnold Mallis, Handbook of Pest Control, 2nd Edition, MacNair-Dorland Co.
"Distribution: Throughout the United States and Southern Canada"—by permission from Destructive and Useful Insects, Metcalf & Flint. McGraw Hill Book Co., Inc.
To request information on U. S. Patent 2,968,591 please write us on your letterhead.
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sylviarum) (may bite man, has been found infected with Newcastle disease and western and St. Louis encephalitis) (Reeves, *et al.*, 1947; Hammon, *et al.*, 1948).

Body-Feather Mite (*Fterophagus strictus*) (does not bite man).

A Pigeon Quill Mite (*Syringophilus bipectinatus*) (does not bite man).

A Pigeon Quill Mite (*Syringophilus columbae*) (Hwang, 1959) (does not bite man).

Pests From Pigeon Nests

Pigeon nests may be the source of infestations of pests of households, stored-food, and fibers (Hicks, 1959). Those commonly found include:

DERMAPTERA (earwigs):
European Earwig (*Forficula auricularia*) (household and agricultural pest).

HEMIPTERA (bugs):
Flower Bugs (*Anthocoris flavipes, Lyctocoris campestris*) (agricultural pests).

LEPIDOPTERA (moths):
Clothes Moths and Allies (*Tinea fuscipunctella, T. pellionella, Tineola bisselliella*) (household and fabric pests).

DIPTERA (flies):
Carnid Fly (*Carnus hemapterus*) (pests).
Lesser House Fly (*Fannia canicularis*) (household pest, causes myiasis in man, human enteric disease vector).

HYMENOPTERA (wasps):
A Parasitic Wasp (*Cephalonomia nidicola*) (stings man, parasitizes yellow mealworm and drug-store beetle).

COLEOPTERA (beetles):

Carpet Beetles and Allies (*Anthrenus pimpinellae, Attagenus pellio, A. piceus, Dermestes bicolor, D. lardarius, D. murinus*) (stored-food and fabric pests, cause intestinal cantheriasis in man).

Yellow Mealworm (*Tenebrio molitor*) (stored-food pest, causes intestinal cantheriasis in man, transmits hymenolepiasis to man).

Cadelle Beetle (*Tenebroides mauritanicus*) (stored-food pest).

Drug-Store Beetle (*Stegobium paniceum*) (stored-food pest).

Spider Beetles (*Ptinus bicinctus, P. fur*) (stored-food pests).

Cryptophagid Beetles (*Cryptophagus badius, C. dentatus, C. hirtulus, C. saginatus*) (stored-food pests).

Hister Beetles (*Gnathoncus punctulatus, Hister carbonarius, H. corvinus*) (pests).

Weevil (*Mecinus pirastor*) (pest).

Lathridid Beetles (*Catodere filiformis, Enicmus minutus*) (pests).

Lady Beetle (*Adalia bipunctata*) (agricultural pest).

Powder Post Beetle (*Anobium punctatum*) (wood destroyer).

Rove Beetles (*Aleochara sparsa, A. villosa, Atheta euryptera, A. fungi, A. nigricornis, A. parva, A. vestita, A. occulta, Bledius diota, Haploglossa marginalis, Omalium allardi, O. caesum, Philonthus fuscus, P. sordidus, Phyllodrepa floralis, P. nigra, Quedius molochinus, Tachyporus obtusus, Xylodromus concinnus, X. testaceus*) (pests).

Predators

Predators produce great pigeon mortality. The chief ones are man, cats, rats, mice, owls, and hawks. Rats destroy large numbers of eggs

Be On The Lookout for Clover Mite Calls

Don' be surprised if telephone callers begin asking for clover mite control even if the calendar indicates cold weather is not far away. These tiny nuisance pests invade homes especially in the fall months when temperatures begin to drop. They want to come in out of the cold. And, by September and October, insecticides sprayed on the lawn in summer will have about lost their killing power anyway. Thus, another treatment during the warm days of fall, when the mites are still comfortably at home in their outdoor environment should hold them under control until really cold weather keeps them surpressed. Such a product as kelthane, applied to the south and west sides of the foundation and walls around doors and windows where the mites are coming in, will do the job. Of course, there's no substitute for soaking the lawn with insecticide.

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and squabs (young). Since the same conditions which produce large pigeon populations also may produce large rat populations, the two are often found together.

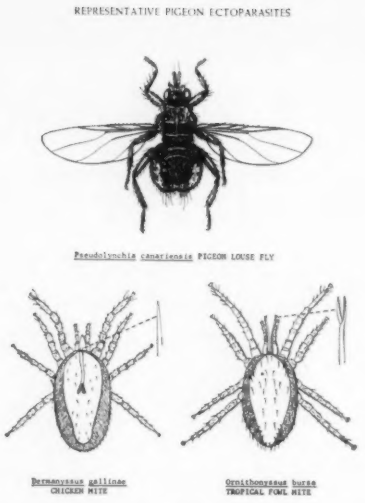
Pigeon Surveys

A thoughful survey of the pigeon problem should precede any attempts at control. Factors (such as sanitation defects) may be uncovered which can be corrected to reduce pigeon populations without offending sensitive portions of the public. The survey should tabulate location of feeding sites, nests, roosts, damage, food contamination, clogged drains, ectoparasite infestations, live pigeons, dead pigeons, and active signs as well as refuse storage conditions, animal food, animal wastes, human wastes, and prevalence of other pest birds. Survey of food for pigeon contamination is described in Harris, 1960.

Pigeon Control

Pigeons are protected to a greater or lesser extent by *State Fish and Game Laws*. In many states, they are under "blanket-protection" as non-game birds. In a few, they are considered as game birds to be hunted only during a fixed season. In still others, they are considered domestic birds and may not be hunted. In all states, pigeons with leg bands are given complete protection. Pigeon control operations should not harm useful birds (Anonymous, 1956; Hockenyos, 1959 and 1960; Thomas, 1957).

Sanitation is an important feature of pigeon control. The size of a pigeon population is determined by the amount of food, water, and harborage available. Pigeon control via sanitation involves proper storage, collection and disposal of refuse; suitable control of human wastes, animal wastes, animal shelters, and structural harborage; plus proper storage of food and other usable items. Elimination of standing water will also help in control. Special attention should be paid to keeping ground around docks and freight car loading areas free from spilled grain and other food. Spoiled grain and other waste food should be incinerated or buried in a sanitary landfill. Grain should be stored in bird proof buildings or containers.


REPRESENTATIVE PIGEON ECTOPARASITES
Pseudolynchia canariensis PIGEON LOUSE FLY
Dermanyssus gallinae CHICKEN MITE
Ornithonyssus bursa TROPICAL FOWL MITE

Pigeon Proofing is the best control technique. Concentrate on elimination of nesting sites which are protected from the weather. Enclosed spaces such as church steeples are screened (½" mesh hardware cloth) and trapped birds are captured and removed. Porticos, windows, doors, ventilators, and ornate architectural features are screened to prevent access. Screening should not create fire or dust hazards, or interfere with ventilation. Roosting ledges are built up with smooth wood or masonry so they slope more than 45°, or are covered with spikes. Architectural planning of new buildings can make them practically pigeon proof. The ornate Georgia State Capitol building was heavily pigeon proofed during recent (1957-59) renovation operations. Use of submarine nets across courtyard entrances at City Hall in Philadelphia failed to keep pigeons out. Mist nets hung over ornate architectural features have proven effective. Trimming of trees may be necessary in some areas. Consideration should be given to modification of building codes to include provisions for pigeon-proofing new construction and to require that existing structures be brought up to standard.

Repellents, if renewed frequently, are effective: naphthalene (in cheesecloth bags hung on roosts), oleoresin of Capsicum (1% alcohol solution sprayed on roosts), calcium chloride, or lye (sprinkled on roosts). Several good proprietary chemical and "sticky" repellents are available (Hockenyos, 1958). These repellents may be objectionable to window-washers and other maintenance personnel. The olfactory sense is present in pigeons, but is poor (Michelsen, 1959), because the nasal cavity is almost entirely shell lined. Therefore, most pigeon repellents involve tactile rather than olfactory response (Fitzwater, 1959).

Frightening and Physical Removal have generally proven impractical. They are based upon the bird's tendency to return to the same roost every night. Birds thoroughly frightened many nights in a row (loud noise, fireworks, fire hoses) or captured by traps (Oderkirk and Fitzwater, 1958; Kalmbach, 1954) or by anesthesization with 1, 1, 1-tribromoethanol or alpha-chloralose in water or food and removed to a distant spot tend to select new roosts and the building may be free of pigeons for a short time. Tribromoethanol produces narcosis in about 8-10 minutes. Alpha-chloralose requires 30-60 minutes to achieve the same effect. Grain soaked in 33.3% alcohol solution of tribromoethanol for 48 hours, dried, then stored in airtight containers has proven highly satisfactory. Prebaiting for 7 days before introducing the anesthetic bait is recommended. A vast majority of the birds will fall unconscious near the feeding station. Unconscious birds are then collected and are removed to a distant location or humanely destroyed. One southwestern city of the United States takes the unconscious pigeons to the zoo where they are used for animal food. If water baits are used, add 300 ml. of 33.3% tribromoethanol solution to each gallon of water. A pigeon "removal" program initiated in Paris (France) in 1960 met with such severe public criticism that it had to be abandoned. Electrification of roosting ledges may be effective, but is expensive. Wires carrying a low voltage current that gives a mild shock are installed.

Ultrasonics (high frequency sound waves inaudible to humans) have been studied as area repellents for pigeons, but have not as yet proven practical. Although birds may be frightened to a limited extent upon first encountering ultrasonics, they soon become accustomed to them. The pigeon cannot hear ultrasonics (man hears

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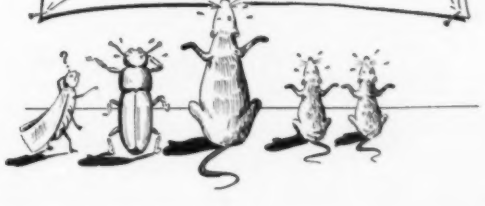

4 octaves lower and one octave higher than pigeons), but may sense them as energy vibrations. Although high-intensity sounds may kill a closely confined animal, no safe practical way has been found to utilize this in pigeon control. Use of electromagnetic impulses (such as radar) to repel pigeons has also been suggested, but never conclusively demonstrated (Kalmbach, 1954; Fitzwater, 1959).

Killing (when safe and legal) is difficult and relatively ineffective. Techniques include *shooting* (check police regulations), *poisoning* (1% strychnine grain after 7 days prebaiting) (Neff, 1959), *mist spraying* (5% ammonia), *residual dusting* (50% dieldrin, for experienced personnel and protected situations only), and *destruction of nests and eggs* (repeat every 2 weeks). Exploding bottles of endrin concentrate amid pigeon flocks is effective (for experienced personnel and protected situations only). Shooting of 300 pigeons on a bridge in New Jersey did not solve the problem. If poisoning is employed, gather dead birds immediately to prevent secondary poisoning of dogs, cats, and other animals.

Trapping has proven effective but slow. Also, since pigeon populations rebuild rapidly, the effect is temporary. Traps are baited with a mixture of one part of wheat to five parts of cracked corn. Empty traps at least every other day.

Public Relations are extremely important in any pigeon control effort. A public information program to explain the need for control should utilize all available media (newspapers, radio, television, civic organizations, etc.).

Recent successful large-scale pigeon control programs in California (Womeldorf and Mortenson, 1960) (Potts and Womeldorf, 1960) can be used as models for future control programs in other parts of the United States.

Control of Ectoparasites should be accomplished prior to other pigeon control operations to prevent dispossessed mites, fleas, ticks, and kissing bugs from migrating to humans in the vicinity. Permanent ectoparasite control can be accomplished by elimination of the pigeons.

Insecticidal control is used (1) when pigeon control cannot be accomplished immediately, and (2) during pigeon control operations to prevent spread of ectoparasites to man. Use DDT (5% spray, 10% dust) or malathion (2% spray, 4% dust) to control bugs, louse flies, fleas, and soft ticks. Use 5% aramite, 1% dieldrin, 2% chlordane, 2% malathion or 2% dimite sprays or dusts to control mites. Lice may be controlled with 1% malathion dust (Rodriquez and Richl, 1959). For general ectoparasite control, spray pigeon-infested areas with 5% aramite, 5% ovex, 1% dieldrin, 2% malathion, or 2% chlordane (at 1 gal./1000 sq. ft.) or dust with 10% aramite, 10% ovex, 2% dieldrin, 5% chlordane, or 4% malathion.

Selected References

Abarbanel, A. 1959. Pigeons aren't pets — they're pests! Today's Health, 37(7): 29, 69, 74-78.
Ajello, L. 1958. Occurrence of *Cryptococcus neoformans* in soils. Amer. J. Hyg., 67: 72-77.
Anonymous. 1956. Bird control. Natl. Pest Control Assoc., Tech. Release No. 6-56, pp. 1-9.
Anonymous. 1958. (Recent data on the epidemiology, symptomatology, diagnosis and therapy of

(*Continued on page 60*)

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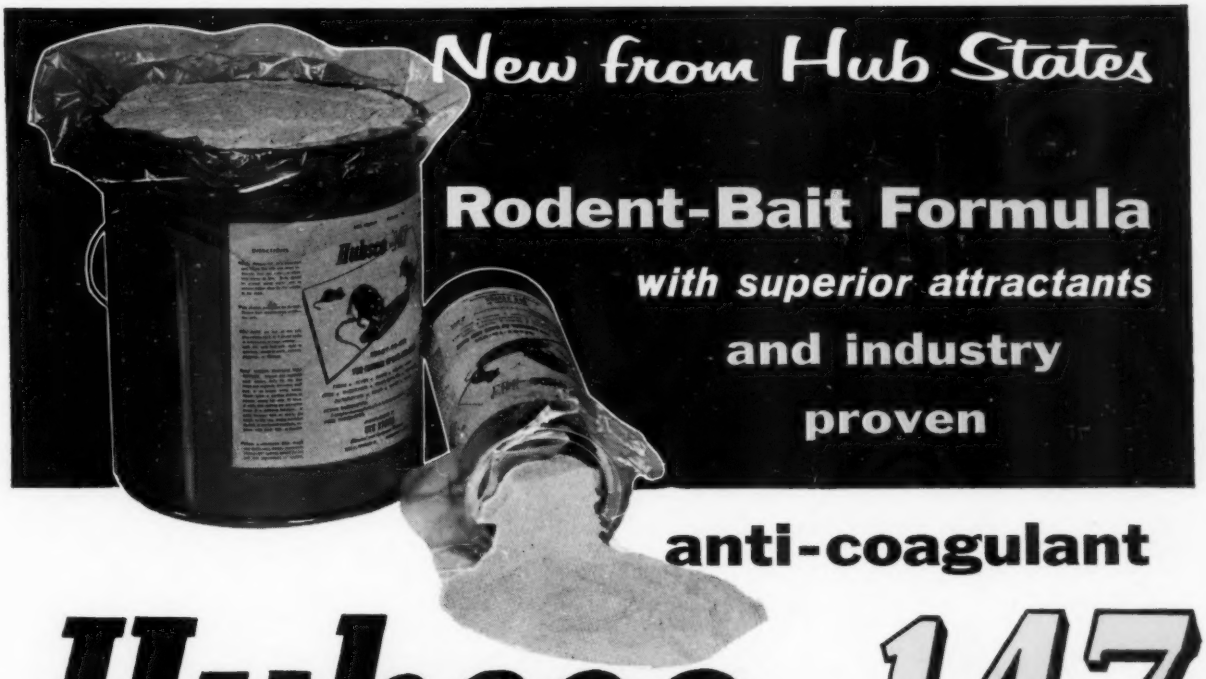

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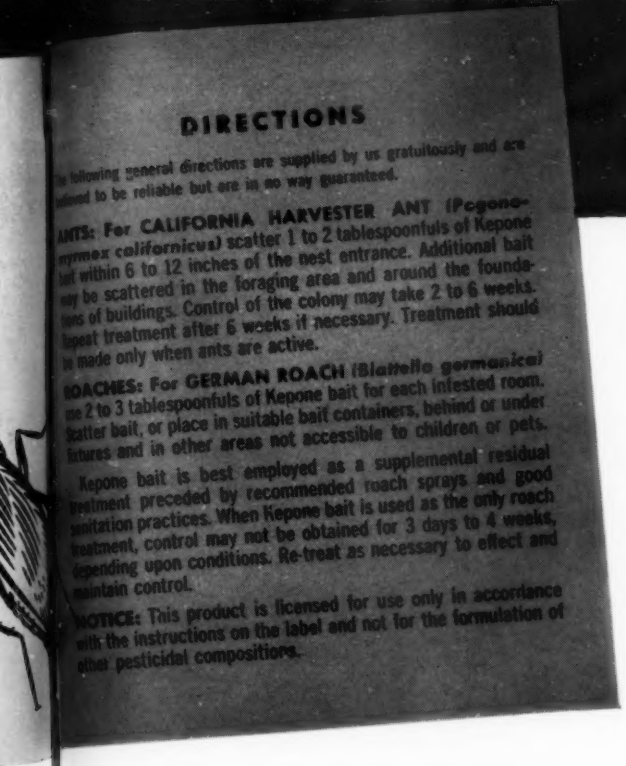
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ROACHES: For GERMAN ROACH (Blattella germanica) use 2 to 3 tablespoonfuls of Kepone bait for each infested room. Scatter bait, or place in suitable bait containers, behind or under fixtures and in other areas not accessible to children or pets.
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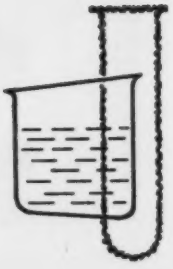

Negatively-Correlated Insecticides

a possible countermeasure for insecticide resistance

By

DR. A. W. A. BROWN

Head
Department of Zoology
University of Western Ontario
London, Canada

AT THE CLOSE of 1960, no less than 137 species of insects, mites or ticks are known to have developed strains resistant to one or more groups of insecticides. In many cases resistance has subsequently developed to the insecticides used as remedial substitutes. Pest control by chemicals would seem to be a one-way street down which we progress from DDT-resistance to dieldrin-resistance to organophosphorus-resistance, leaving it littered with the useless corpses of insecticides once highly effective.

Meanwhile insect control must continue, and presumably with new chemicals of some kind. Can we discover compounds which will throw this progression into reverse, and eliminate the resistance rather than merely remedy it? On theoretical but nonetheless valid grounds, we must conclude that a chemical which is more toxic to the resistant strain than to the corresponding normal strain would furnish the answer that we desire.

Past experience with houseflies, and other insects, has established that strains made DDT-resistant by the selective effect of DDT applications have become also resistant to methoxychlor and DDD; that is, cross-resistance to methoxychlor or DDD is positively correlated with that to DDT. On the other hand, little or no cross-resistance is shown to BHC or the cyclodiene derivatives — dieldrin, endrin, heptachlor, etc.; i.e. there is no correlation between DDT and the cyclodiene derivatives or BHC. Similarly, strains that have acquired resistance to applications to BHC or one of the cyclodiene derivatives show little or no cross-resistance to DDT or its relatives; but the cross-resistance within the cyclodiene group, including BHC, is positively correlated. Neither DDT-resistant nor cyclodiene-resistant strains show any cross-resistance to the organophosphorus compounds; thus the DDT group, the cyclodiene-BHC group and the OP group are uncorrelated. However, when OP-resistance has been developed by repeated OP applications, such strains show an even stronger cross-resistance to DDT and the cyclodiene group, at least in houseflies (Meltzer, 1958) and larvae of the mosquito *Aedes aegypti* (Brown & Abedi, 1960).

But our special interest is in pairs of compounds whose cross-resistance characteristics are neither positively correlated nor uncorrelated, but negatively correlated; that is, strains or individual insects made more resistant than normal to the one compound have thereby become more susceptible than normal to the other compound. With such paired mixtures, Plackett & Hewlett (1948) were the first to point out that individuals capable of withstanding the one would be therefore killed by the other. Subsequently Hewlett & Plackett (1950) concluded that such mixtures could not lead to the development of resistance. For as we now know, resistant strains originate from the few members of the population naturally resistant to the single insecticide employed. With pairs of negatively-correlated insecticides, individuals resistant to the one would inevitably be eliminated by the other, and so resistance to either insecticide would be nipped in the bud. Such considerations led Busvine (1957) to stress the practical importance of negatively-correlated insecticides to prevent the spread of resistance in insects of public health importance.

The first discovery of negatively-correlated compounds was made by Ascher & Kocher (1954), who reported that a DDT-resistant strain of houseflies at the Geigy laboratories in Basel, Switzerland was more susceptible than the normal strain to KBr and other inorganic bromides; these were administered orally and the DDT-resistant strain showed a faster knockdown than the normal strain. Ascher (1957) continued this line of enquiry in Rome, Italy by searching for bromine-containing compounds that possessed residual insecticidal activity, and found them in esters of bromoacetic acid of which cetyl bromoacetate (CBA) was the most effective; when tested by continuous tarsal contact on the deposit, flies of 2 DDT-resistant strains showed faster and greater knockdown by CBA than 2 susceptible strains. This property of greater susceptibility to CBA was also shown by a chlordane-resistant and a Diazinon-resistant strain (Ascher 1958a, 1958b), and even a strain repeatedly selected by chloroacetic acid but not resistant to it. Lauryl chloroacetate also showed negative correlation with DDT in the Basel

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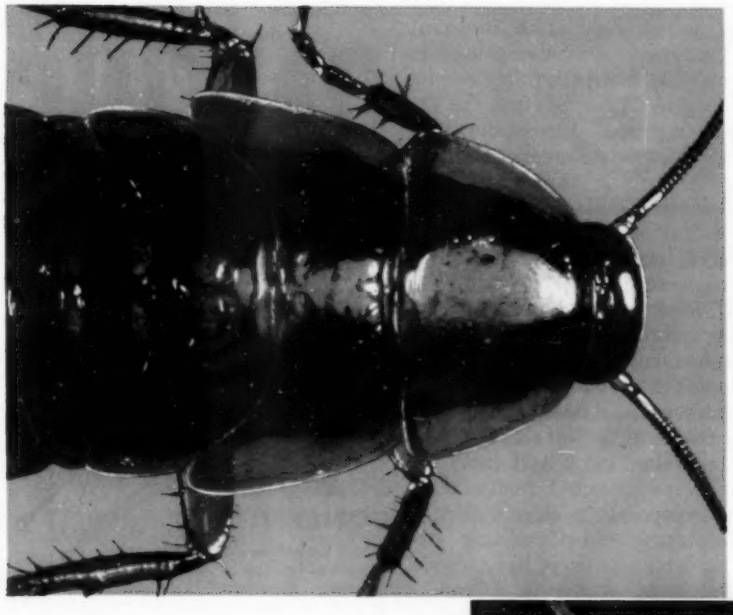

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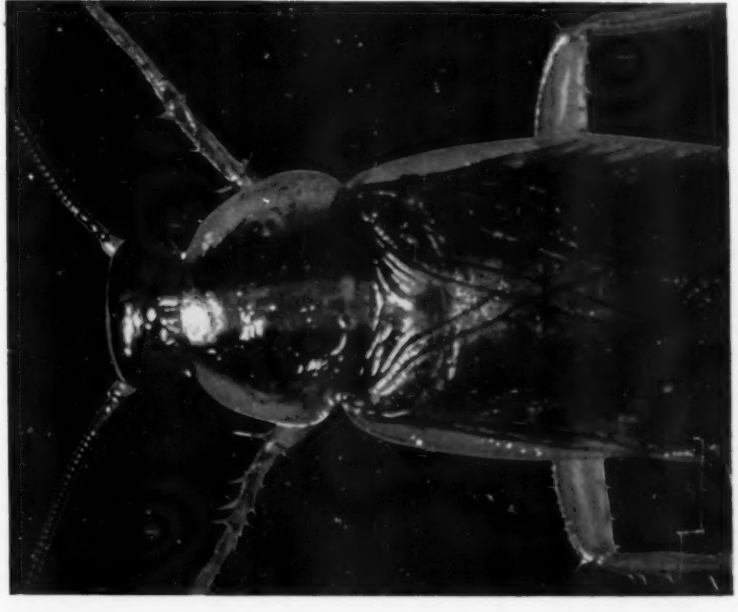

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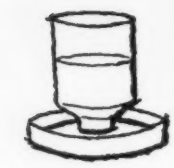

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strain (Ascher, 1958c). For the property in a strain resistant to one insecticide to be abnormally susceptible to another (negatively-correlated) insecticide, Ascher (1958d) proposed the term "resistance-induced enhanced susceptibility" or R.I.E.S.

Meanwhile his colleagues Bettini, Boccacci & Natalizi (1958a), using a short test exposure of 30 minutes followed by observation in clean conditions, confirmed that CBA killed flies of 4 resistant strains more rapidly than 2 normal strains; but if the mortality counts were made 24 hours after the exposure to graded deposit densities (a more orthodox method of toxicity testing), it turned out that CBA showed higher median lethal concentrations than normal to 3 of the 4 resistant strains. Similar results were obtained with myristyl bromoacetate, although the authors conceded that in general a higher susceptibility to these bromoacetates existed in the resistant strains. Subsequently Bettini, Boccacci & Natalizi (1958b) reported that cetyl and myristyl bromoacetates acted faster than the corresponding chloroacetates in inhibiting SH-containing enzymes, which is their basic mode of action in attacking carbohydrate metabolism. Hopes for a practical demonstration of CBA in reversing the resistance of Danish houseflies were dashed when Keiding (1958) found it to be actually less toxic to the resistant strains than to their normal counterparts, even when a continuous-exposure test method was used.

From these results, Ascher (1958e) concluded that CBA showed its properties of negative correlation under conditions of continuous contact and not on all strains of houseflies. Later Ascher (1960a) suggested that the poor showing of CBA in the Danish tests might have been due to a) older flies being used for test, b) ether anaesthesia disrupting the "fat barrier" and c) the susceptible strains having been obtained from reverted resistant strains. Very recently Ascher (1960b) has reported finding negative correlation with DDT in cetyl fluoride (CF) and cetyl fluoroacetate (CFA) for housefly larvae but not adults, and

(Continued on page 40)

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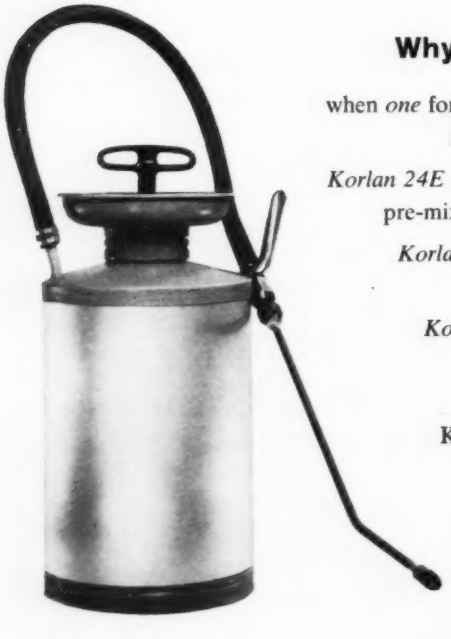

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Correspondence Course in Pest Control Technology

By DR. LEE C. TRUMAN*

Lesson No. 9

Birds and Other Vertebrates

BIRDS: Class Aves

THE CONTROL of birds is one of the more difficult operations a pest control operator is called on to perform. Because many birds are protected by law or ordinance, the operator must be certain he is not running afoul of the law in his work. In addition, Audubon Societies, local groups of naturalists, and just plain bird lovers will frequently make life difficult for anyone who tries to control birds on a large scale. Opposition to bird control can usually be prevented or reduced by discussing the contemplated program with leaders of societies or organizations devoted to protection of birds.

Before attempting bird control work on a scale which is likely to attract public notice, the pest control operator should, insofar as possible, get the blessing of a few key public officials, such as the mayor or members of the city council and of any other major group of businessmen if the work is to be done in a city. This can usually be obtained by explaining that you are to control only nuisance birds and that the method of control to be used is humane.

The principal birds to be controlled are the common pigeon, *Columba livia* Gmelin; the English sparrow, *Passer domesticus* (Linnaeus); the European starling, *Sturnus vulgaris* Linnaeus. Species such as robins, woodpeckers, and others may at times require control.

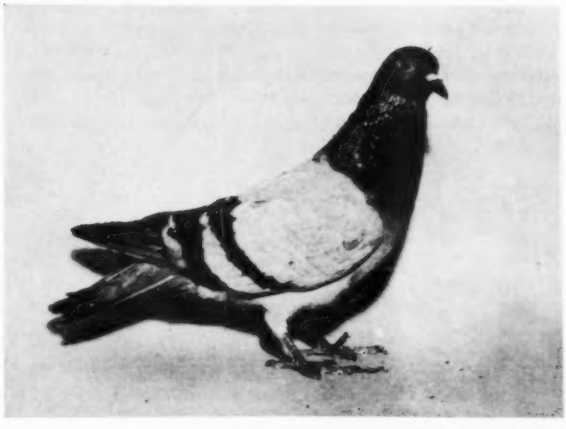

Figure 9-A. The pigeon or rock dove. The diversity of color patterns in this species is extreme, but there are no other birds which occur in the United States which would be likely to be confused with the pigeon. The only bird with which it might be confused is the mourning dove, but they can be readily distinguished from each other by the tail which is fan-shaped in the pigeon and pointed in the mourning dove. (All illustrations in this lesson by William D. Fitzwater, courtesy of the U. S. Department of the Interior, Bureau of Sport Fisheries and Wildlife, Branch of Predator and Rodent Control, Lafayette, Indiana.)

PIGEON (ROCK DOVE), *Columba livia* Gmelin; Family Columbidae

Pigeons are well known as pests to any city dweller (See Figure 9-A). Their droppings deface buildings and create a cleaning problem on city sidewalks. Their nests stop up gutters and rainspouts, and the acid in their debris causes premature rusting and corrosion in such exterior parts of buildings as roof flashings, fire escapes, gutters, and downspouts. A few pigeons in a city park may be an aesthetic asset, but droppings on fountains, benches, and on the clothing of people using the park are objectionable.

Pigeons are pests in towns and cities. Only rarely do they appear in any great numbers in rural areas, except around feed mills and cattle or hog feeding farms. In cities these birds tend to move in flocks of several hundred, all of which frequently move about, fly, and roost together. Occasionally a smaller group will select a house or a few houses on which to roost, but usually they prefer larger buildings. Their nests are built of small twigs on roofs, ledges, and even in drain spouts and these, together with birds which die near the roost, cause a great deal of damage by stopping up the drain spouts.

Each female lays 1 or 2 eggs which hatch in 17 to 22 days. The young reach maturity in about 4 weeks but, before this time, the female has laid more eggs thus keeping up an almost continual breeding cycle. Birds driven from one roosting area will often pick out another and continue on as though they had not been disturbed.

The close association of pigeons with the habitations of man presents a potentially serious epidemiological problem because these birds harbor many diseases.

The most publicized of these is ornithosis (or psittacosis in parrot-like birds). This is a disease similar to virus pneumonia that can be transmitted to man through infected droppings or respiratory droplets. Surveys have shown that as much as 30 to 75% of a

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*Correspondence Course Editorial Committee: Dr. John V. Osmun, Dr. Howard O. Deay, William L. Butts, Dr. Philip J. Spear, Dr. Harry D. Pratt, George L. Hockenyos, and James A. Nelson.

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pigeon flock may be infected without visible effects.

Because its diagnosis in humans is rather difficult, it is often called "flue" or "atypical pneumonia." This disease is undoubtedly of more importance than is commonly realized.

Many species of birds, including pigeons, have been implicated as reservoirs of the encephalitides. These diseases of the central nervous system are transmitted from birds to man by mosquitoes but the exact role of pigeons in the epidemiology of encephalitis viruses is as yet unknown.

Several outbreaks of systemic fungus diseases in man, principally histoplasmosis caused by *Histoplasma capsulatum* and cryptococcus caused by *Cryptococcus neoformans,* have been traced to association with pigeon manure. *Salmonella typhimurium,* which causes food poisoning, has been found in substantial portions of pigeon flocks. Toxoplasmosis, a disease caused by the protozoan *Toxoplasma gondi,* is frequently found in pigeons. This has also been known to be transmitted from pigeons to man.

Of lesser importance to man directly, but in some cases imperfectly understood are: Newcastle disease, aspergillosis caused by *Aspergillus fumigatus;* thrush (*Candida albicans*); pseudo tuberculosis caused by *Pasturella pseudo tuberculosis;* avian tuberculosis caused by *Mycobacterium tuberculosis,* (var. avian); pigeon coccidiosis caused by *Eimeria labbeana;* swine erysipelas caused by *Erysipelothrix rhusiopathiae;* and trichomoniasis caused by *Trichomonas gallina* and *Hemoproteus columbae.*

THE EUROPEAN STARLING,
Sturnus vulgaris Linnaeus; Family Sturnidae

Starlings are pests both in city and in rural areas (See Figure 9-B). They travel in flocks, as do pigeons. In rural areas, they nest in tree cavities and on ledges about farm buildings. Starlings are not usually too bothersome except around grain elevators, corn fields, fruit trees, and in cattle and hog feeding lots. On feeding lots they can easily devour enough of the food intended for the livestock to cause serious economic loss.

Figure 9-B
The European starling. Note the speckled appearance of the feathers on the body and the short tail. The beak is bright yellow. Immature birds have a dark beak, a longer tail, and a rather drab, unmarked coloration.

Normally starlings spend warm weather in rural areas. However, when it becomes cold in the fall, they will move in large flocks into towns and cities at night to seek the warmth and shelter of larger buildings or to roost in large numbers in trees in residential areas and in city parks.

During the daylight hours they will fly back to the country in search of food only to return to the city again at night.

Starlings fly as a group from their roosts at the first sign of anything unusual such as sudden noise or flashing lights. They rapidly become accustomed to regular noise, however, and are not disturbed on the fronts of buildings even by heavy truck traffic and flashing neon lights.

Although only 3 to 6 eggs are laid, usually twice a year, starlings are quite hardy and able to survive under difficult conditions so that great flocks of them are formed.

ENGLISH SPARROW,
Passer domesticus (Linnaeus) Family Ploceidae

There are many species of sparrows in the United States and none of these are serious pests. We refer to one of our most common pest species as the English sparrow, and the name is so deeply ingrained in the everyday vocabulary that it will probably never be abandoned.

Figure 9-C. The English sparrow or house sparrow. The male of this species (left) has a dull gray crown and a distinct black area beneath the beak and covering the throat. The female (right) lacks the throat patch and is dull colored with no sharply contrasting markings.

This bird is not a true sparrow but belongs to another family whose members are called weaver finches. (See Figure 9-C). This small bird, which moves in flocks, can be a nuisance out of all proportion to its size because it is very active, and argumentative. It is a pest in gardens, orchards, and about buildings where it builds its nests. Sparrows in any numbers will frequently drive small songbirds out of an area.

Their nests are almost invariably built in or near buildings used by man. These nests of twigs, grass, paper, or almost anything else that the bird can carry, are built in gutters, on roofs, ledges of buildings, inside buildings on roof supports, and only rarely and when crowded out of other places, in trees and shrubs around buildings. Nests around power lines and in electrical sub-stations have created serious fire hazards and their droppings are an annoyance wherever they congregate.

Five or 6 eggs are laid 3 or 4 times a year.

OTHER BIRDS

Many other birds such as the pileated woodpecker, *Dryocopus pileatus* (Linnaeus); the hairy woodpecker, *Dendrocopos villosus* (Linnaeus); the chimney swift, *Chaetura pelagica* (Linnaeus); the yellow-bellied sapsucker, *Sphyrapicus varius* (Linnaeus); the purple martin, *Progne subis* (Linnaeus); grackles, *Quiscalus* spp.; the brown-headed cowbird, *Molothrus ater* (Boddaert) (See Figure 9-D), gulls (family Laridae); blackbirds (family Icteridae) and even the robin, *Turdus migratorius* Linnaeus, are sometimes pests.

Color patterns are quite important in identifying most of these birds, and numerous books are available which include color pictures of most of our common birds. No good general method of control has been developed for any of them. The pest control operator must try to adapt his control methods to each situation as he finds it. Pentachlorophenol sprayed on timbers has been useful in keeping some of these birds

away and bird glues have been used with success in some situations.

CONTROL

Before beginning any bird control operations which may intentionally or otherwise destroy birds, the pest control operator must check to be sure the birds to be eliminated are not protected by federal, state, or local laws or ordinances. Birds are difficult enough to control without the operator finding himself in trouble with the law.

The first step in control is to make a thorough survey to find out the extent of the flock and where the birds are roosting and nesting. Birds in trees and on the faces of buildings can easily be located from the ground. When they are on the tops of high buildings, it is necessary to go to the roof of the highest building that you have access to in the area and examine not only this roof but also those of all other buildings in the vicinity. A pair of binoculars is a good tool to use for making this inspection.

Many different methods have been used to control the 3 principal pest birds: starlings, pigeons, and sparrows. They can be grouped into 4 general classes: (1) building out, (2) repelling, (3) trapping, and (4) killing the birds.

Build Them Out

The most certain way to keep birds off the face of a building is to construct it so there are no roosting places on it. This requires cooperation between the pest control operator and the architect when a building is being planned. This is being done with many new government and privately-owned buildings.

Wide ledges and overhanging cornices must be avoided, sculptures and other forms of ornamentation must be designed to present no place on which birds can roost or build their nests. It is usually impossible to make an entire building bird-proof, but thoughtful consideration of the elimination of roosting and nesting areas at the time of construction can greatly reduce the bird nuisance.

On ornate buildings, and buildings with overhanging ledges, belfries, towers and other such construction, birds can be effectively screened out with *wire netting* having openings not greater than one inch. Wherever birds are getting inside buildings, all openings which cannot be closed permanently should be screened in this manner. In some buildings with open sides, screening can be dropped down from the edge of the roof to reduce the size of the opening and still make it possible to use the building.

Where ledges are not more than a few inches wide, light metal such as *sheet aluminum can be installed at a 45° angle* to present a surface on which the birds cannot nest. This gives permanent protection to the ledge.

Pointed wires and *sharp pointed metal strips* have been installed on ledges where birds roost to prevent them from landing. These devices are effective, particularly in limited areas such as over doorways, when the birds can go someplace else to roost. When birds (particularly pigeons) are crowded, they frequently carry in pieces of straw, sticks and other nesting material and build a mat over the protruding points so they can go on nesting and roosting as usual. Installation of these devices is expensive and difficult and, unless conditions are particularly favorable for their use, may not be very effective.

Charged wires, similar to those used in cattle fences, have been used with some success. This, again, is an expensive device to install and a very difficult one to keep in operation. The wire must be fully insulated from the building, a condition almost impossible to achieve because sticks and straws dropped by the birds, as well as the bodies of dead birds will short out the wires in a brief time. Where wires can be kept clean, this method works very well.

Repellents

Various *scare devices* have been installed on buildings to control birds. Stuffed or papier mâché owls, balloons on long strings, rubber snakes, tinfoil streamers which flutter in the wind, and many other objects have been tried. Many of these work fairly well for a time where the bird population is not heavy but, when roosting space is at a premium, they are usually ineffective.

Since birds are usually distrubed by *sudden, loud, or unusual noises*, many devices have been designed to scare them off in this way. One such device makes use of the gas from calcium carbide to make a loud

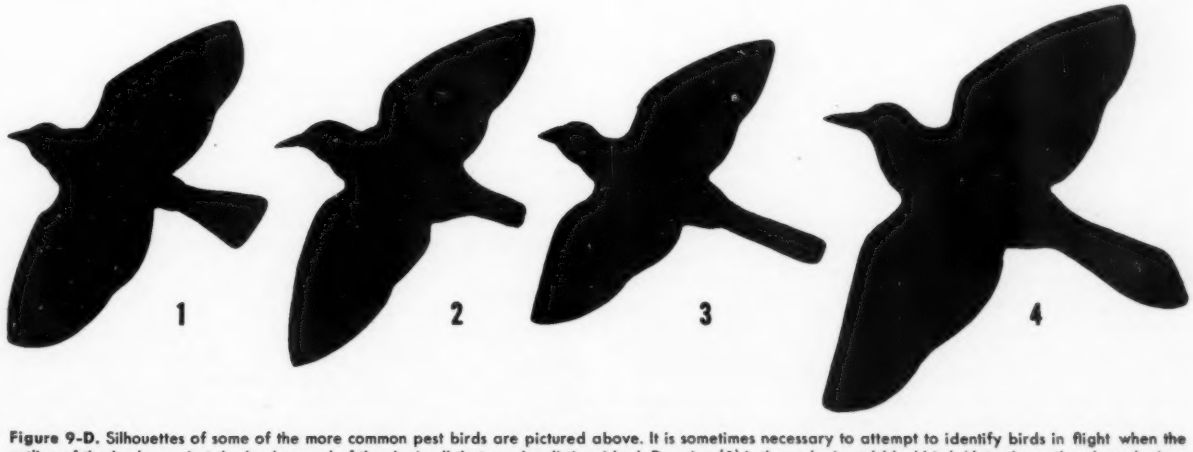

Figure 9-D. Silhouettes of some of the more common pest birds are pictured above. It is sometimes necessary to attempt to identify birds in flight when the outline of the body against the background of the sky is all that can be distinguished. Drawing (1) is the red winged blackbird. Note the rather broad wings and short neck. The tail is somewhat fan-shaped. In silhouette (2) we see the European starling which has quite broad wings and a tail that is quite short in relation to the size of its body. Immature birds have longer tails than adults and are much more difficult to identify in this manner. Illustration (3) is of the cowbird. Note that its wings and body appear slimmer than in the other species and that the tail is relatively long and straight. At the far right (4) is the grackle. This bird is somewhat larger than the others pictured here. The wings are broad, the neck is relatively long, and the tail is long and wedge-shaped. The outline of its tail is important.

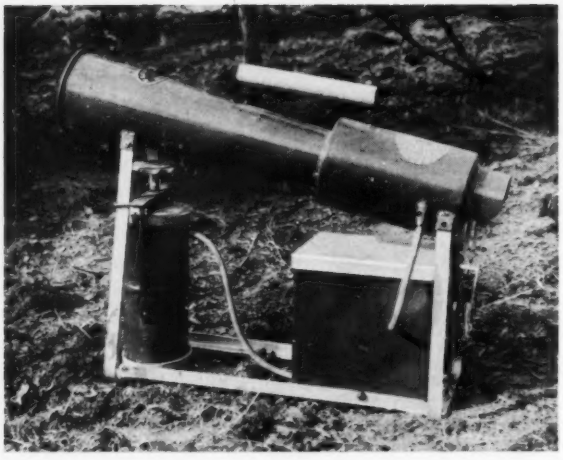

Figure 9-E. An acetlylene exploder, a device used to frighten birds from roosting places. This machine emits a loud blast at regular intervals. It can be carried easily and there is no particular hazard involved in using the machine. Such devices are not suitable for use in close proximity to human habitations, since the noise is just as disturbing to man as to birds.

popping sound at intervals (Figure 9-E). *Large vibrators* such as those used to shake flour from bins, have been installed on girders to vibrate the girders and at the same time make a loud noise.

One manufacturer has developed a machine which emits the *recorded distress calls* of starlings in an attempt to frighten these birds. Such sound machines may be effective in a limited situation, but have not been effective over large areas, or in many restricted areas. These devices also have the disadvantage of usually being far more disturbing to human beings who have to listen to them than they are to the birds.

Ultrasound, which cannot be heard by people, has been used in some situations. Various machines have been designed to produce this sound and all have worked with something less than complete success.

Some operators have thrown *firecrackers* into flocks of birds to disperse them. In view of the fact that many birds will not return to an area in which they have had a bad experience, this method works well in many situations. The operator should make certain that he is not violating local ordinances regulating the use of fireworks before using this method of control.

The success of repellents in bird control depends upon: (1) timing — starting control measures when birds first appear both seasonally and daily, (2) persistence — keeping the birds in movement for 3 or more days until the habit pattern is broken, and (3) variation — changing location and type of repellents constantly.

Various *bird glues or jellies* are available for keeping birds away from buildings. These vary in consistency. Some are thick, tacky material, others are of jelly-like consistency, and still others are thin enough to be sprayed. The heavier materials are most suitable for use on ledges and buildings. Spray materials are designed for use on trees, although they can be used in almost any situation.

Heavy bird glues are usually applied with a putty knife, caulking gun, or from containers pressurized by an air compressor for large jobs. For best results, it is necessary to prepare the surface to which bird glue is to be applied by wiping it clean of all dirt, debris and bird droppings. Non-porous surfaces, such as metal, do not require additional preparation, but porous surfaces such as concrete, wood, brick and stone should be sealed with a clear sealer so the liquids in the glue will not be drawn into them. Some operators have used strips of impervious tape over the surface on which bird glue is to be applied. Failure to seal the surface properly will cause the glue to dry and will shorten the length of time it will be effective.

Glue should be applied in strips as thick as ½ inch to the surface of ledges, roofs and anywhere else birds may roost or nest. This depth of material is usually necessary in order to be sure that the glue remains sticky. These strips of glue should be placed no more than 3 to 4 inches apart so birds will not have room enough to land between them without becoming entangled.

The life of such applications depends upon how long it takes the glue to dry and upon the amount of dirt and dust that may accumulate on it. A good application of a well-formulated glue will normally last at least 1 year and possibly more. Spray formulations applied to trees or building surfaces are much thinner and usually will not last as long as heavier glues.

Proper glue applications to buildings is one of the best ways to repel birds; however, they have disadvantages. Where they are visible they deface the building. On window ledges, they are a hazard to window cleaners. Because the window cleaners will track the glue over floors and carpets, such furnishings can be badly damaged. Whenever this happens the glue can usually be removed satisfactorily with mineral spirits or a similar solvent. Pigeons and starlings can be repelled from their roosting places with bird glue, but in nesting areas pigeons will frequently make a mat of sticks and straws over the glue and go on nesting as usual.

Weak solutions of *ammonia water in mist blowers* have been used to discourage birds, particularly starlings. A fine mist of the solution is blown into trees or on buildings when birds are roosting, giving a considerable degree of success. Applications for several nights are usually necessary to dislodge the birds and treatments may be required several times during a season. Mist treatments are easily done at a relatively low cost.

Each of these control methods depends on repelling birds from their accustomed roosting and nesting places. This is usually quite satisfactory to the pest control operator's own client but may create an unfavorable reaction with the owners of properties to which the birds go.

The only really effective way to control birds is to kill them so they do not have an opportunity to reproduce and continue as a nuisance. Any method of killing birds must be quick and humane and, particularly in towns and cities, must be carried out as far as possible without attracting public attention.

Trapping

Trapping has long been successful as a method of controlling pigeons. The birds can be captured alive in suitable traps in such places as city parks and on the roofs of buildings. (See Figure 9-F). It is not usually practical to use traps that require attention more often than every day or two, hence self-setting cage traps are preferred. A trap must be placed as near to a natural feeding area as possible and, although this is usually at ground level, traps can be used effectively on flat roofs. Various methods are used to attract

birds to the traps. In many instances, grain is placed in the area for several days to get birds accustomed to feeding in the vicinity before a trap is placed. When the baited trap is placed in the area, a few live birds are frequently confined in it to make its presence seem more natural to wild birds.

Suggestions on Killing Birds

Birds removed from traps should be disposed of humanely, usually either by breaking their necks or by poison gas. Either of these operations should be conducted out of public view to avoid a bad reaction from bird lovers. Birds should never, as is frequently recommended, be taken into the country and released for they will only return to become a nuisance again.

Trappers must be very careful to examine trapped pigeons before killing them to be sure that no racing pigeons are killed. Racing pigeons will have a leg band. They can either be released or held for their owners.

Some cities undertake programs of *shooting* pigeons and starlings. This work is usually done either by the city police or by a local civic group rather than by a pest control operator. Shooting serves to kill some birds and to drive off many more. Such a program must, however, be carried on constantly and continuously if good results are to be obtained. Generally, this type of program should not be used since it is impossible to avoid public attention. The bad public relations that almost invariably result usually create a greater problem than the birds.

Poisoning is probably the most effective way to kill pigeons and sparrows.

Starlings usually cannot be poisoned in a city because they are there only to roost. Since they nest and hunt for food in the country, they can sometimes be poisoned on outlying public garbage dumps, particularly during periods of heavy snow cover.

Seeds poisoned either with thallium sulfate, strychnine sulfate, or strychnine alkaloid, are commonly used. It is obvious from the nature of these chemicals that seeds poisoned with them are quite hazardous to anyone or anything which may handle or eat the baits. Therefore, extreme care must be taken when they are used.

Baiting programs, whether urban or rural, first require that you find out what grain the birds will eat. Wheat, oats, corn, barley, rice, and commercial bird seed mixtures can be put out unpoisoned to see which attracts the birds. Generally, birds in cities will feed on any of the grains, while those around farms and feed mills are usually controlled best by one that was not present prior to baiting operations.

The operator must be very careful to place bait so it will not create a hazard to people, pets or other domestic animals. In rural areas poisoned grain must not be put where it will be available to cattle, chickens, or hogs, and in cities, where it will be touched by children.

Prebaiting with unpoisoned grain can frequently be done to accustom the birds to feeding at such places as flat roofs, unused areas between buildings and areas outside fenced enclosures for farm animals. After the birds have become accustomed to the type of feed being used and to the areas in which it is being placed, poisoned bait can be placed. Be certain to put out enough to satisfy the appetite of every bird which will feed on it. Frequently one bait placement is sufficient to kill most of the birds feeding in an area and to cause the others not to return for an extended period of time. When necessary, baiting can be continued for several days but should not be continued on a large scale any longer than necessary. Arrangements should always be made to pick up dead birds and dispose of them either by burning or burial.

In the vicinity of industrial plants, baiting for pigeons can be maintained on a regular monthly basis. This work can be quite effective simply by keeping poison bait exposed in certain spots on the flat roofs of plant buildings where the hazard is relatively slight.

Sparrows frequently roost and nest inside large buildings, which cannot be closed tightly, and take up residence on beams and other supports under the roof. In this case, a good degree of control can be obtained by placing a supply of poisoned grain in pans or trays fastened in the area. The sides of these pans and trays should be at least 2 inches high so the grain will not fall down to the floor of the building and should be large enough so birds can get into them. This technique usually works equally well under roofs over outside loading docks and other similar places.

A perch with a wick type surface which is continually saturated with endrin has recently been placed on the market. These perches can be placed at strategic places throughout a structure so birds will roost on them. Endrin enters the body through their feet and will usually kill roosting birds in a few days. There

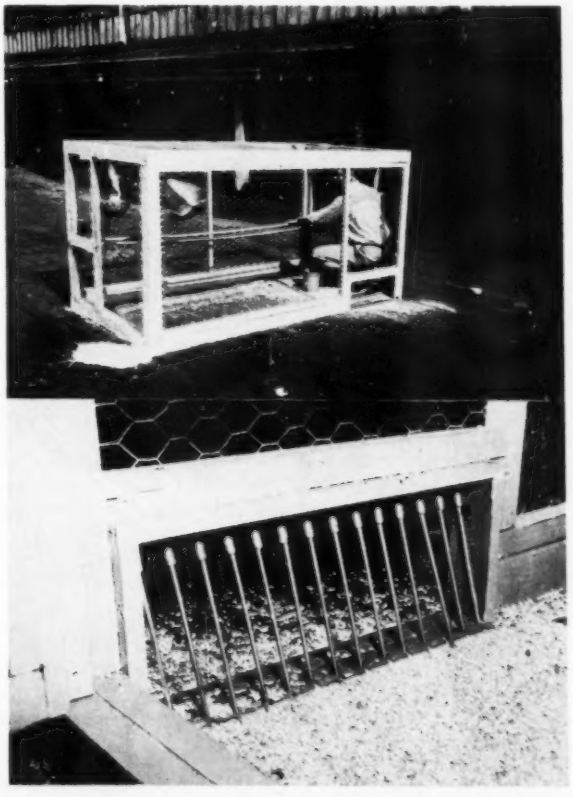

Figure 9-F. A large trap suitable for trapping pigeons. Traps of this type are not difficult to build and are very well suited for placement on flat roofs. **Above** is a view of an entire trap. Note the size in relation to the man who is working inside. The photo **below** shows a close-up of the door mechanism, seen from inside the cage. The vertical rods are hinged at the top and will swing inward readily. After the bird has passed through, the rods fall back into their original position, dropping against the horizontal piece of slotted metal. This type of trap is quite humane, and the only stress placed on the pigeons is that of confinement within a small enclosure.

is a considerable hazard involved in the use of such poisons and special care should be used to avoid food or feed contamination.

BATS: Order Chiroptera

Even though they fly, bats are mammals and not birds. Their bodies are covered with fur and they bear their young alive. Their wings are a leathery membrane stretched between the greatly elongated bones of their front legs and toes and extending, in most species, back along the sides of the body to the hind legs and tail. Bats are the only mammals which can fly, although some others, such as flying squirrels, can glide for considerable distances.

In nature, bats roost in dark places such as caves, tree cavities, and under overhanging rocks. They have, however, easily adapted themselves to living in buildings where they roost in attics, hollow walls, chimneys, under hollow floors, and other similar places. Because of such habits bats are of concern to the pest control operator. A few species live as individuals, but most congregate in large colonies so that infestations are frequently severe. The bats roost suspended upside down by their hind feet. No nests are built. The young, being born while the mother is in this suspended position, cling to her body until they are able to move about by themselves. Droppings and urine deposits under roosting areas have a strong, disagreeable and persistent odor which is quite characteristic and will usually serve to attract new bats to a roosting place even though the original inhabitants have been removed.

Bats are nocturnal animals, roosting by day and flying by night in search of night-flying insects which are their principal source of food.

When a roost is located in an attic or any other closed space which can be easily reached and from which the chemical odors will not be objectionable, either naphthalene or paradichlorobenzene can be used to repel the bats. Three to 5 pounds of either chemical sprinkled in an average attic will usually drive the bats outside even in the daytime.

Because bats are easily attracted to areas where other bats have been roosting, it is necessary to close all openings through which they may enter. Smaller bats can crawl through openings as small as $\frac{3}{8}$ inch, so no opening larger than $\frac{1}{4}$ inch can be left. Larger openings should be closed entirely with wood, oakum, metal or concrete, excepting where ventilation is required, then $\frac{1}{4}$ inch mesh hardware cloth can be used. Be sure all bats are out of the building before closing openings. One way to do this is to close all but a few openings and then wait several days until the bats become accustomed to using those that are left. Then, when the bats are all out at night, close the remaining openings.

If repellents and bat-proofing cannot be used, bats can be killed easily with calcium cyanide. This operation is dangerous and should be done only by operators thoroughly familiar with the hazards involved and in areas where there is no possible danger to occupants of the building.

Bats can also be killed with 50% DDT tracking powder, or by an application of a heavy dose of DDT wettable powder as a spray. Either the dust or spray should be applied liberally to roosts, exit openings, and surrounding areas. A spray application is usually preferred because it will adhere better to surfaces on which bats rest. These methods can be used only in places which children or pets cannot reach since these chemicals in the quantities required can be dangerous.

Use of these insecticides has an added advantage over other methods of control by also killing various arthropod parasites which might otherwise infest a house after leaving the dead bats.

Dead bats and droppings should be removed from the premises wherever this is possible because the odor from their decaying bodies can be quite offensive. This odor and the odor remaining from the roost can be covered up by paradichlorobenzene or any deodorant used to mask the odor of dead rats.

SQUIRRELS and CHIPMUNKS: Family Sciuridae

Squirrels of various species may enter buildings and cause damage. While they generally build their nests in trees, some species will settle in an unused attic if conditions are favorable. The pest control operator must first determine how the squirrels are entering a building and make every effort to seal existing openings with sheet metal or $\frac{1}{4}$ inch hardware cloth. Where they are gnawing their way in directly through wood, the wood can be covered with a repellent paint made with 2 quarts water, 3 pounds asphalt emulsion, and 2 pounds of copper carbonate. This mixture is easily applied with a brush; however, it is black and should not be used where its appearance will deface a building. Squirrels can also be repelled from buildings by the liberal use of naphthalene or paradichlorobenzene in enclosed spaces which they may enter.

Frequently squirrels will get into a building from a single overhanging tree limb. Where this is the situation, simply prune the limb back 6 feet or more so they cannot reach the building from it.

When screening, repelling, and removing tree limbs will not solve the problem, trapping or killing the squirrels may be necessary. Because most squirrels are protected animals, the pest control operator must make certain that he is not violating any laws in his trapping or killing procedures. To obtain clearance, consult your local game conservation officer. In many areas it is possible to obtain a special permit or other permission to eliminate squirrels where they can be shown to be a nuisance.

Where squirrels cannot be killed, trapping with live traps is usually the best method of control. Traps should be placed, unset, in areas where they are to be used until the squirrels become accustomed to them. Baits placed by the traps will attract the squirrels to them. Once they have become accustomed to the traps, a few settings will usually capture enough squirrels to eliminate the problem. If the animals may be killed, ordinary snap rat traps can be used for smaller squirrels. Number 0 or Number 1 steel traps can be set in areas in which food has been scattered about.

In cases in which the squirrel population is small, they can be controlled by shotgun. In thinly populated areas larger gauge guns can be used, but in closely built up areas, nothing larger than a .410 gauge should be used. The operator must be sure that he is not violating any laws when controlling squirrels with firearms.

When squirrels cannot be killed or captured outside, or prevented from entering a building, they can be poisoned inside. Suitable food, such as acorns or grain seeds, can be poisoned with strychnine, arsenic, thallium sulfate, or zinc phosphide and placed in small mounds where the squirrels are running. Be very careful not to place such baits where children and pets can reach them.

Chipmunks are small squirrels which often cause a great deal of trouble by burrowing under buildings and into flower beds. They are difficult to trap but

can usually be controlled in their burrows with calcium cyanide dust. Chipmunks normally wander about searching for food during daylight hours and are in their burrows at night. Calcium cyanide should be put into the burrow only at night and its opening should be firmly closed with dirt to contain the gas.

SKUNKS: *Mephitis* spp.; *Conedatus* spp.; *Spilogale* spp.

Because of their odor, skunks create a particularly bad problem when they live near or under buildings. It is undesirable to use any method of control which will cause the skunks to eject their musk, or to die close by or beneath a building. For these reasons, trapping and poisoning are not usually good methods.

Skunks are usually a problem where they have gained access to the space underneath a building. They can often be repelled by liberally sprinkling naphthalene or paradichlorobenzene into the area and closing all entrances after the skunks have left.

Skunks can be trapped or shot. If you use either of these methods, be sure to comply with all game laws since skunks are protected animals.

MOLES: Family Talpidae

The burrows of moles cause a great deal of defacement to lawns and gardens adjoining them, and moles themselves cause damage to ornamental plants by destroying their roots while searching for the earthworms and insect larvae which are their principal food.

Various poison baits and traps have been used to control moles. Traps are difficult to use and, because they require daily attention, are not normally a practical method for the pest control operator. Raw peanuts treated with thallium sulfate have given fair to good results in destroying moles. Two or 3 treated peanuts are inserted at 8 to 10 foot intervals in fresh workings in mole runways.

Mole damage to lawns can usually be controlled by applying such chemicals as chlordane or dieldrin to the soil to kill off their food supply. Applications are made at a rate of about 12 pounds of actual chemical to the acre with water emulsion, wettable powder, or granular insecticide.

SNAKES: Suborder, Serpentes

Snakes of many kinds find their way into and under buildings and thus become a problem for the pest control operator. Snakes in their natural surroundings should be left alone both because they are generally beneficial animals and because the poisonous species are dangerous.

Where it is possible to do so, the underparts of buildings should be closed tightly or screened so snakes cannot get into them. Where this is not possible, a heavy application of DDT or chlordane dust or wettable powder should be applied to the affected areas taking adequate precautions to keep children and pets out of the treated space. In the southern states snakes, many of them poisonous, are found by pest control operators underneath houses where they have to work to control other pests. In these cases, it is not practical to make heavy applications of DDT or chlordane because the operator would then have to crawl through the insecticide in order to do his work. In such situations the snakes are sprayed directly with oil-based chemicals such as DDT or chlordane. Some pest control operators report good results using ordinary insecticide base oil with no insecticide in it.

Selected References

Albarbanel. 1959. Pigeons aren't pets—they are pests! Today's Health, July, 1959, p. 29.

Anon. 1957. Birds and health. Ohio Cities and Villages, June, 1957.

Bent, Arthur Cleveland. 1958. Life histories of the North American blackbirds, Orioles, Tanagers, and Allies. U.S. National Museum Bull. #211. vii + 545. Illus.

Giovannoni, M. 1946. On the occurrence of Hemoproteus in the pigeon. Arg. Biol. E. Tecnol. v. 1, 1. 19-21 (Biol. Abst.)

Peterson, Roger Tory. 1960. A Field Guide to the Birds. Houghton-Mifflin Co., Boston. xxiii + 290. Illus.

Scott, Harold George. 1959. Pigeons. USPHS. CDC Training Leaflet, 4 p.

Schorger, A. W. 1952. Introduction on the domestic pigeon. Auk, v. 69, p. 462-463.

Wellman, G. 1950. The transmission of swine erysipelas by a variety of blood sucking insects to pigeons. Zentralba. Bakt. I. Abt. Orig. v. 155, p. 109-115 (Biol. Abst.).

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Next Month: Pests of Stored Products

Management Consultants, Rogers, Slade & Hill to Conduct Forum

No Change in Registration Fee: Men $25; Ladies $20

Careful budgeting has made it possible to maintain the registration fee for the Miami Beach convention at the same level it has been for several years: $25.00 for men, and $20.00 for the ladies.

Included in the charge is attendance at all sessions, the Sunday reception for early arrivals and newcomers, Monday evening's Tropical Mixer party, the tour of Miami and visit to the Seaquarium, the Lady Bug lunch at Vizcaya, and the social event of the convention: Thursday evening's banquet and dance.

Those attending their first NPCA convention will be treated to breakfast on Tuesday morning. A "New Members" breakfast is also on tap for Wednesday morning before the formal program gets under way.

Advance registration is requested. Members and sponsored visitors can write NPCA headquarters at 250 West Jersey St., Elizabeth, N. J. for necessary forms.

New Officers to be Picked

Charles Houghton, of Safety Fumigant Co., Boston, Mass., currently executive vice-president of the NPCA, is in line to become president for the coming fiscal year. Final decision, however, rests with members who cast their votes for all association officers late Thursday afternoon.

Newly elected officers and board members gather early Friday morning to select members of the Executive Board which meets between annual conventions.

Over 50 Prizes

A treat that's popular with convention goers is the now-annual drawing for door prizes that takes place Thursday afternoon. Presents are contributed by exhibitors and suppliers.

All delegates have to do to be eligible for the drawing is to visit each of the booths at the trade show, held in connection with the meeting, get their prize-card properly stamped by the exhibitor and then deposit it in the drawing-box. Winners must be present when the awards are made.

Nassau Extension Technical

A post-convention session will be held at the British Colonial Hotel in Nassau in the Bahammas on Saturday morning, Oct. 21. A government speaker is to address PCOs on compliance with current legislation and safe practices, according to word from the NPCA.

Airplanes will depart from Miami for Nassau three times on Friday, October the 20th, and arrangements have been made to return during the day on the following Monday.

Time will be made available for a boat trip around Hog Island, a visit to Paradise Beach, calls on Dirty Dick's, the Junkanoo, the Cat & The Fiddle, the Goombay Club, sailing and swimming. Special hotel and transportation rates have been made available to NPCA convention delegates. For details, write association headquarters in Elizabeth, N.J.

Non-Members Welcome

Non-members of the NPCA can attend the convention if they pay the full registration fee and are sponsored by a member.

Weather Balmy in October

Summer clothes are appropriate for Miami Beach in October, but pack a sweater or jacket for evening wear. Swim suits should come too for use in hotel pool and at Nassau. Don't forget sunglasses!

Two crack executive counselors from the nationally-known New York based management consultant firm of Rogers, Slade & Hill will provide an invaluable business forum on Monday afternoon at this year's National Pest Control Association convention, October 15-19. The five-day confab, headquartered at Miami Beach's Hotel Deauville, is expected to draw the largest attendance in the 28-year history of this association's annual meetings.

According to Thomas Nelson, head of the firm's management division, the full-afternoon session will begin with two addresses: "What Is Modern Management?" and "What Does the Modern Manager Have to be Like?" Next there will be an informal analysis of typical case histories to demonstrate how to put modern management practices to work in the pest control business.

NPCA secretary Dr. Ralph E. Heal told PC it is a rare privilege to have this top-level organization appear on the convention program this year to assist PCOs who are increasingly being confronted with the need to up-date their business practices.

In keeping with the "how-to" theme announced here last month, the Tuesday morning program is to feature "How to Run a Training Session," being arranged by Thomas W. McCloud of W. B. McCloud & Co., Chicago, Ill. We're told a surprise is in the offing when delegates are informed "How to Use NPCA Offerings."

On Thursday, James Steckel of Tornado Manufacturing Co., Columbus, Ohio, is to present some suggestions on "How to Promote Your Public Relations in Your Own Community."

"How to Cut Down on Accidents" will be the emphasis of another speaker on Thursday afternoon who will highlight safe practices from the insurance standpoint.

You'll be eligible to attend the

National Pest Control Association Convention

(28th annual NPCA meeting, Miami Beach, Fla., October 15-19, 1961)

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DR. RALPH E. HEAL
Executive Secretary
NATIONAL PEST CONTROL ASSOCIATION
250 West Jersey St., Elizabeth, New Jersey

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On behalf of _____
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I _____ hereby make application
(Authorized representative of firm) (Title)
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Date _____ Signed _____

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NATIONAL PEST CONTROL ASSOCIATION

An Invitation from Florida NPCAers

A Guest Editorial written especially for this issue

By

RICHARD L. LEWIS

National Chairman, NPCA Convention Committee

ON BEHALF OF ALL Florida Members of the National Pest Control Association, let me extend a cordial invitation for the industry to attend the NCPA Convention in Miami Beach, October 15-19th. Committees were appointed months ago and are functioning to be sure that your stay on the Gold Coast will be a profitable and enjoyable experience.

Many of you are aware of the fine facilities offered in this area for a meeting such as ours. The Deauville Hotel is among the finest and our entire group can be taken care of under one roof. In this connection I would like to mention that while Miami Beach is a rather expensive place during the winter season, October is not a part of this season. Special rates have been arranged for and you will find the finest food and service reasonably priced. You will long remember this convention after you return to your homes.

I mentioned that your attendence would be a profitable experience. We feel that it is possible for you to save many more times the actual expense involved if you take advantage of the suggestions and ideas presented from the convention floor. For example, surveys conducted by our Association reflect that our industry is not in line with other service industries in office and administrative expense. Therefore a session will be held on this important phase of our business.

Another survey has indicated a need to stress our public relations program and the training of our sales-service personnel. These items will be covered in Miami Beach. There will be a portion devoted to how we can better use the facilities of the NPCA, as well as reports from those in government and education dealing with research and development. One entire day will be devoted to committee meetings which will be open for you to attend those of your choice.

Mr. Lewis runs Lewis-Cobb Exterminating Co. in Orlando, Florida

On the other side, and because we don't want to neglect to entertain you, our committees are busy to insure that there will be time available for fun and relaxation. A golf tournament is planned for duffers and par shooters alike. There also are trips for sightseers, the beach, and of course the entertainment highlight of the convention — the Banquet and Ball. Rest assured you and the ladies will long remember your brief stay in Miami Beach this year.

This convention is being planned with you in mind. We know you want to meet old friends and find new ones. We know you want some good sound advice about your business. We know that you want to be entertained. All this can be yours if you come to Miami Beach in October for the National Pest Control Association Convention.

I haven't mentioned the ladies, however, you have not been forgotten. In fact, for the time of your life come to the Miami Beach convention. There is no place like this fabulous Gold Coast.

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Negatively-Correlated Insecticides
(*from page 26*)

in CF but not CFA for larvae of the mosquito *Anopheles astroparvus*. However, when tested on larvae of *Aedes aegypti* (Brown, 1960), CFA was no more toxic to DDT-resistant than to normal strains, and CBA was scarcely larvicidal to any strain.

At one time it appeared that a negatively-correlated substance was present in DTP, a technical grade of diisopropyl tetrachloroethyl phosphate; this was found by Mitlin, Babers & Barthel (1956) to be 2 to 6 times as toxic to the DDT-resistant Orlando strain of houseflies as to the normal NAIDM strain. Kearns (1957) immediately saw the possibilities and applied DTP selection pressure to a DDT-resistant strain containing some 5 per cent of susceptible individuals, and succeeded in transforming it to a DDT-susceptible strain in 3 generations. But attempts to repeat these results, made at Riverside (Metcalf & Fukuto, 1961) and at Beltsville with new preparations of DTP, found that it was no more toxic to DDT-resistant than normal strains in the first place.

Recently a negatively-correlated insecticide in the truest sense has been discovered by Ogita (1958a) in Osaka, Japan. It is PTU, known to the organic chemists as phenylthiourea and to the geneticists as phenylthiocarbamide or PTC; it is an inhibitor of the enzyme tyrosinase (Schneidermann & Gilbert, 1958). Starting from the well-known fact that the ability of humans to taste PTC is decided by allelism in a single gene, Ogita tested this compound (i.e. PTU) on DDT-resistant and normal strains of the fruit fly *Drosophila melanogaster*. In this species, resistance to DDT and many other insecticides is determined mainly by allelism in a single gene located at map-distance 65 on Chromosome II (Tsukamoto & Ogaki, 1954). Ogita found that DDT-resistant fruit flies were much more susceptible to PTU than normal individuals and that PTU-susceptibility was a property of the DDT-resistant gene allele itself. With mixtures of PTU and DDT of the order of 2-to-1, Ogita (1958b) was able to kill DDT-resistant or DDT-susceptible strains without selecting in either direction for PTU-resistance or for DDT-resistance. On the other hand, selection with PTU alone (Ogita, 1959a) restored DDT-susceptibility to a DDT-resistant strain of *Drosophila*.

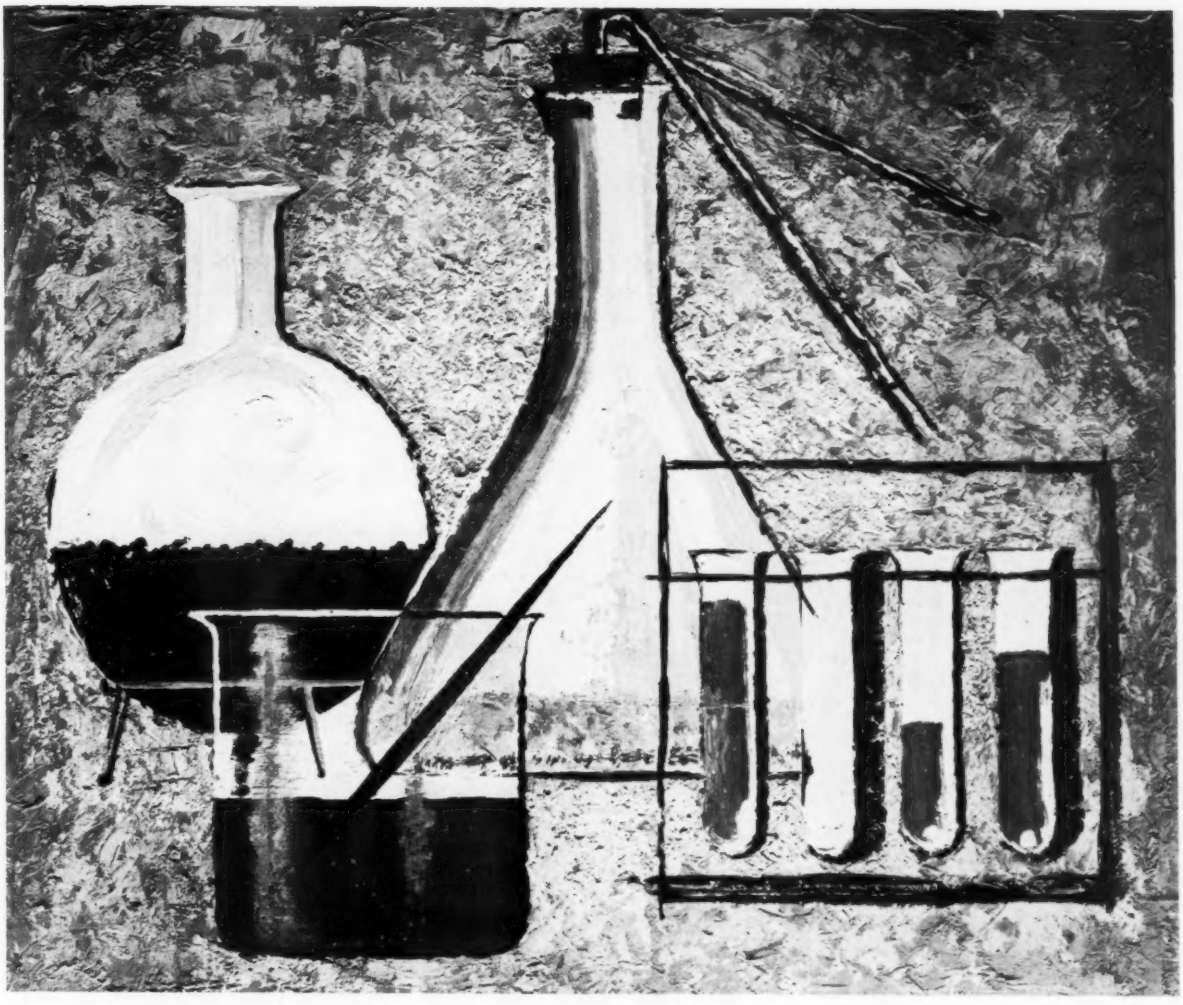
However, in wind tunnel tests against adult houseflies (Entomology Research Division, 1959a), PTU and derivatives proved ineffective against susceptible and resistant strains alike. In experiments on housefly larvae with high concentrations of PTU, Tahori (1960) found no significant difference in PTU-susceptibility between 5 different types of resistant strains and 2 normal strains. With Danish houseflies, Keiding (1959) found PTU to be a poor insecticide and not to show negative correlation with DDT or other insecticides. For larvae of *Aedes aegypti* (Brown, 1960), PTU was ineffective whether the strains were DDT-resistant or not.

The researches on houseflies at Osaka have so far been limited to OP-resistant strains, and Ogita (1960) has reported finding PTU more toxic to a Diazinon-resistant strain than to a normal one. He has recently found (Ogita, 1959d) that phenylisothiocyanate shows negative correlation with Diazinon, parathion or DDVP to the point that the paired mixtures give the complete kills of houseflies that PTU-DDT mixtures did with *Drosophila*. Ogita (1959c) tested whether the negative correlation shown by KBr with DDT for houseflies also applied for *Drosophila*; he found it to be so in most but not all strains.

There are a few instances in the literature of insect strains resistant to one group of insecticides showing enhanced susceptibility to an-

Your October Issue Will be a Little Late

Our October issue this year will be mailed about two weeks late, at convention time, to bring you the latest news of the National Pest Control Association's 28th Annual Convention in Miami Beach, Fla. So, don't worry if your Oct. *PC* is about 14 days late. It'll be bonus-big, and worth waiting for.



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other. A Sicilian strain of houseflies resistant to chlorinated hydrocarbons proved abnormally susceptible to malathion (Mariani, 1953). Enhanced malathion-susceptibility was also reported for a cyclodiene-resistant strain of the cotton boll weevil (Young & Roussel, 1958). The DDT-resistant Korean strain of the body louse proved more susceptible to Sevin than the normal colony (Entomology Research Division, 1959b). These instances demand investigation to ascertain whether the negative correlation is purely coincidental in the strains concerned. Winteringham & Harrison (1959) reported that houseflies of a dieldrin-resistant strain recovered more slowly than the normal from anaesthetics such as CO_2, cyclopropane and ethylene dichloride. Enhanced CO_2-susceptibility had also been noted for a DDT-resistant strain of *Drosophila* by Tattersfield & Kerridge (1955), but they found it to be an independent characteristic of the strain and not of its DDT-resistance.

Discovery of pairs of negatively-correlated insecticides, preferably tied to the pleiotropism (multiple action) of the same gene allele as with PTU and DDT in *Drosophila*, still remains the only imaginable solution to the resistance problem if chemical control is still to be continued. That negative correlation exists under certain conditions for certain strains of houseflies has been demonstrated by Ascher with CBA. The possibility of finding genetically-tied pairs of insecticides for the housefly is now being explored by Ogita. Negatively-correlated pairs have been discovered in the vast field of bacterial resistance to antibiotics; examples of such pairs cited by Ascher (1960) in his authoritative review on R.I.E.S. are sulfapyrazine and sulfathiazole for *Shigella sonnei* and bacitracin and penicillin for *Staphylococcus aureus*. The search for such pairs for particular pest insects should therefore be pursued, particularly since it involves little more than the addition of a resistant strain alongside the normal colony of the species used in screening insecticides. Success in this search would completely transform the present gloomy picture of insecticide-resistance.

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References Cited

Ascher, K. R. S. 1957. Enhanced susceptibility of a DDT-resistant strain of houseflies towards alkyl and aryl bromoacetates. Riv. Parassit. 18: 185-197.

Ascher, K. R. S. 1958a. Preferential knockdown action of cetyl bromoacetate for certain laboratory-reared resistant strains of houseflies. Bull. Wld. Hlth. Org. 18: 675-677.

Ascher, K. R. S. 1958b. Enhanced knockdown in various laboratory-reared resistant housefly strains subjected to continuous contact with cetyl bromoacetate. Zeitschr. fur Naturforsch. 13b: 138-139.

Ascher, K. R. S. 1958c. Chemicals affecting the preimaginal stages of the housefly. VII. The contact toxicity of some alkyl bromo- and chloroacetates for third-stage larvae. Riv. Parassit. 19: 139-155.

Ascher, K. R. S. 1958d. Aufsuchung der "durch Resistenz induzierten, erhohten Empfindlichkeit" — eine neue Versuchsrichtung zur Bekampfung der Resistenz gegen Insekticide. Arzneimittel-Forschung 8: 771-773.

Ascher, K. R. S. 1958e. A common information source for all resistance problems in biology, urgently needed in view of the paucity of effective countermeasures to insecticide-resistance. Indian Jour. Malariol. 12: 615-625.

Ascher, K. R. S. 1960a. A review on "resistance-induced enhanced susceptibility" in insects, with some notes on similar phenomena (especially "collateral sensitivity") in microorganisms. Arzneimittel-Forschung 10: 450-461.

Ascher, K. R. S. 1960b. Resistance-induced enhanced susceptibility towards cetyl fluoroacetate (CFA) and cetyl fluoride (CF) — a preliminary report. XIth Int. Congr. Entom., Vienna (prepublication summary, Section 12).

Ascher, K. R. S. and C. Kocher. 1954. Enhanced susceptibility of a highly resistant strain of houseflies to ingestion of potassium bromide. Experientia (Basel) 10: 465-466.

Bettini, S., M. Boccacci and G. Natalizi. 1958a. Behaviour of various susceptible and resistant strains of *Musca domestica* towards cetyl and myristyl bromo- and chloro-acetates. Indian Jour. Malariol. 12: 447-452.

Bettini, S., M. Boccacci and G. Natalizi. 1958b. A comparative study on the speed of action of

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by

HAL BUNTING
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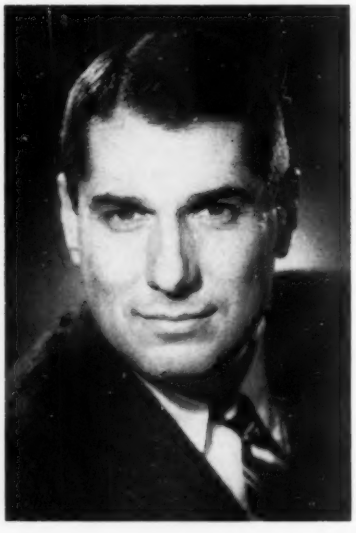

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some halogen-containing thiol alkylating agents on resistant house flies. Jour. Econ. Ent. 51: 880-882.

Brown, A. W. A. 1960. Past, present and future in insecticide-resistance of mosquitoes. Mosquito News 20: 110-115.

Brown, A. W. A. and Z. H. Abedi. 1960. Cross-resistance characteristics of a malathion-tolerant strain developed in *Aedes aegypti*. Mosquito News 20: 118-124.

Busvine, J. R. 1957. Insecticide-resistant strains of insects of public health importance. Trans. Roy. Soc. Trop. Med. Hyg. 51: 11-36.

Entomology Research Division. 1959a. Quarterly Report of Entomological Research, Ent. Res. Div., U. S. Dept. Agr., First Quarter; summarised in World Health Org., Inf. Circ. on Insecticide Resistance No. 19, p. 5.

Entomology Research Division. 1959b. Quarterly Report of Entomological Research, Ent. Res. Div., U. S. Dept. Agr., Fourth Quarter (Dec. 31).

Hewlett, P. S. and R. L. Plackett. 1950. Statistical aspects of the joint action of poisons, particularly insecticides. II. Examination of data for agreement with the hypothesis. Ann. Appl. Biol. 37: 527-552.

Kearns, C. W. 1957. Communication of 27 July, reported in World Health Org., Inf. Circ. on Resistance Problem No. 8, p. 6.

Keiding, J. 1958. The relation between resistance to insecticides and the effect of cetyl bromoacetate in Danish strains of *Musca domestica* L. Indian Jour. Malariol. 12: 453-468.

Keiding, J. 1959. House fly control and resistance to insecticides on Danish farms. Ann. Appl. Biol. 47: 612-618.

Mariani, M. 1953. Comportamento di mosche DDT-sensibili e DDT-resistenti di fronte al Malathion. Bull. Soc. Ital. Biol. Sper. 29: 1774-1776.

Meltzer, J. 1958. Unspecific resistance mechanisms in the house fly, *Musca domestica* L. Indian Jour. Malariol. 12: 579-588.

Metcalf, R. L. and T. R. Fukuto. 1961. Toxicity of diisopropyl tetrachloroethyl phosphate and its vinyl analogue to resistant houseflies. Bull. Wld. Hlth. Org. 24:670-672.

Mitlin, N., F. H. Babers and W. F. Barthel. 1956. The relative toxicity and mode of action of some chlorinated phosphates. Jour. Econ. Ent. 49: 544-546.

Ogita, Z. 1958a. The genetical relation between resistance to insecticides in general and that to phenylthiourea (PTU) and phenylurea (PU) in *Drosophila melanogaster*. Botyu-Kagaku 23: 188-205.

Ogita, Z. 1958b. A new type of insecticide. Nature 182: 1529-1530.

Ogita, Z. 1959a. The change of the resistance level to various insecticides by selection pressure with PTU (phenylthiourea) and PU (phenylurea). World Health Org., Inf. Circ. on Insecticide Resistance No. 17, p. 7.

Ogita, Z. 1959b. Genetic and biochemical studies on negatively correlated substances to the insecticides in *D. melanogaster*. Paper printed by Japan Agricultural Chemicals and Insecticides Co., Chuo-Ku, Tokyo; abstracted in World Health Org., Inf. Circ. on Insecticide Resistance No. 17, p. 7. To be published in Botyu-Kagaku, Vol. 25 (1961).

Ogita, Z. 1959c. Personal Communication, November 17.

Ogita, Z. 1959d. Genetic studies on action of mixed insecticides to insecticide-resistant strains in *D. melanogaster* and *M. domestica*. Paper printed by Japan Agricultural Chemicals and Insecticides, Chuo-Ku, Tokyo.

Ogita, Z. 1960. Personal Communication, May 18.

Plackett, R. L. and P. S. Hewlett. 1948. Statistical aspects of the independent joint action of poisons, particularly insecticides. I. The toxicity of a mixture of poisons. Ann. Appl. Biol. 35: 347-358.

Schneidermann, H. A. and L. I. Gilbert. 1958. Substances with juvenile hormone activity in crustacea and other invertebrates. Biol. Bull. 115: 530-535.

Tahori, A. S. 1960. The larvicidal effect of phenylthiourea against resistant and susceptible housefly strains. Bull. Wld. Hlth. Org. 22: 584-585.

Tattersfield, F. and J. R. Kerridge. 1955. The effect of repeated spraying of insects on their resistance to insecticides. II. Conditioning by the administration of sublethal concentrations. Ann. Appl. Biol. 43: 630-644.

Tsukamoto, M. and M. Ogaki. 1954. Gene analysis of resistance to DDT and BHC in *Drosophila melanogaster*. Botyu Kagaku 19: 25-32.

Winteringham, F. P. W. and A. Harrison. 1959. Reported in World Health Org., Inf. Circ. on Resistance Problem No. 16, p. 6.

Young, M. R. and J. S. Roussel. 1958. The effects of temperature on the efficiency of insecticides applied topically to boll weevils differing in susceptibility to chlorinated hydrocarbon insecticides. Jour. Econ. Ent. 51: 93-100.

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KEYS TO COMMON NORTH AMERICAN DOMESTIC TERMITES

By DR. HAROLD GEORGE SCOTT

Insect and Rodent Control Training Section, Communicable Disease Center, Atlanta, Georgia

The following simple keys can be used to tentatively determine the type of termite involved in any given infestation.

Fig. A—Winged Adult

Fig. B—Soldier

Fig. C—Worker

Key to Winged Adults

1. Radius without branches; fontanel (fig. E) usually present 2
   Radius (fig. D) with branches; fontanel absent 4
2. Tibia (fig. F) slightly to plainly blackish 3
   Tibia entirely pale; Ontario to Guatemala, west to Utah and Arizona (*Reticulitermes flavipes*) ..... Eastern Subterranean Termite
3. Tibia slightly darkened; length 9 mm.; British Columbia to Baja California, east to Idaho and Sonora (*Reticulitermes hesperus*) ..... Western Subterranean Termite
   Tibia generally darkened; length 9.5-10 mm.; Oregon and Montana to western Mexico, Missouri, and Texas (*Reticulitermes tibialis*) ..... Arid Subterranean Termite
4. Ocelli (fig. E) present 5
   Ocelli absent; western Canada to Baja California (*Zootermopsis angusticollis*) ..... Western Rotten-Wood Termite
5. Body yellow to light brown 6
   Body blackish; California to Baja California, east to Arizona and Utah (*Kalotermes minor*) ..... Western Dry-wood Termite
6. Transverse rows of long hairs on tergites; South Carolina to Florida, west to eastern Texas (*Kalotermes snyderi*) ..... Eastern Dry-wood Termite
   No transverse rows of hairs on tergites; Arizona and California (*Procryptotermes hubbardi*) ..... Arid Dry-wood Termite

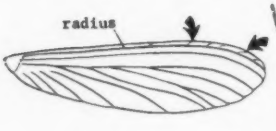

Fig. D—Wing

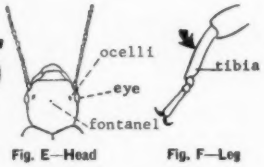

Fig. E—Head

Fig. F—Leg

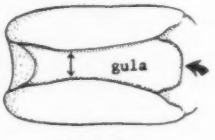

Fig. G—Throat

Key to Soldiers

1. Fontanel (fig. E) present; eyes usually absent 2
   Fontanel absent; eyes (fig. E) present 4
2. Gula (fig. G) not twice as broad in front as in middle ..... Arid Subterranean Termite
   Gula twice as broad in front as in middle 3
3. Head twice as long as broad ..... Western Subterranean Termite
   Head less than twice as long as broad .. Eastern Subterranean Termite
4. Antenna (fig. E) with 23-31 segments 5
   Antenna with 10-20 segments ..... Western Rotten-wood Termite
5. Third antennal segment as long as next 3 combined ..... Eastern Dry-wood Termite
   Third antennal segment shorter than next 3 combined ..... Western Dry-wood Termite
   Third antennal segment as long as next 4 combined ..... Arid Dry-wood Termite

Down Drilling, Low Pressure Favored for Soil Treating

While termite control operators normally drill downward instead of rodding horizontally, and apply chemicals under lower pressure for termite-soil treatment under slabs, these practices are not universal. A recent survey of nearly 100 PCOs who do termite work emphasizes the need for up-dating the Approved Reference Procedures for Soil Treating currently under way by committees of the National Pest Control Association.

Representatives of every section of the country, including Canada, were asked: "Normally, on slab-on-ground construction, would you treat by horizontal rodding or by drilling straight down into the soil?" and "How much pressure do you think is necessary to get good penetration of your chemical into the soil?"

Most respondents, 55% of them, replied they would drill straight down. Of the remainder, 31% prefer horizontal rodding, but 14% said they used both methods.

Others explained the decision to rod horizontally, or drill downward, depends upon the presence or absence of a vapor barrier under the slab.

A Canadian TO said, "The method I'd use depends upon whether or not there are radiant heating pipes buried in the slab and if there is a moisture barrier under the slab. If there is no soil covering, and no pipes in the slab, I usually drill downward. Otherwise I have to rod sideways."

"I like the horizontal method best," a Texan told us. "But if there is no expensive tile or other type of floor covering, and horizontal rodding would be more difficult, then I use vertical drilling and a B & G sub-slab injector."

"Have used both methods, but find horizontal rodding to be the most practical and less expensive," an operator from Illinois said. A Kansas TO reported that the method he uses is determined by the depth of the slab to ground level.

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what pressure is best for injecting the soil poison, be it vertically or horizontally, there is a wider spread of opinion. And the differences cannot be laid to soil variables in divergent sections of the country. The range is from 20 lbs. psi to 400 lbs. psi!

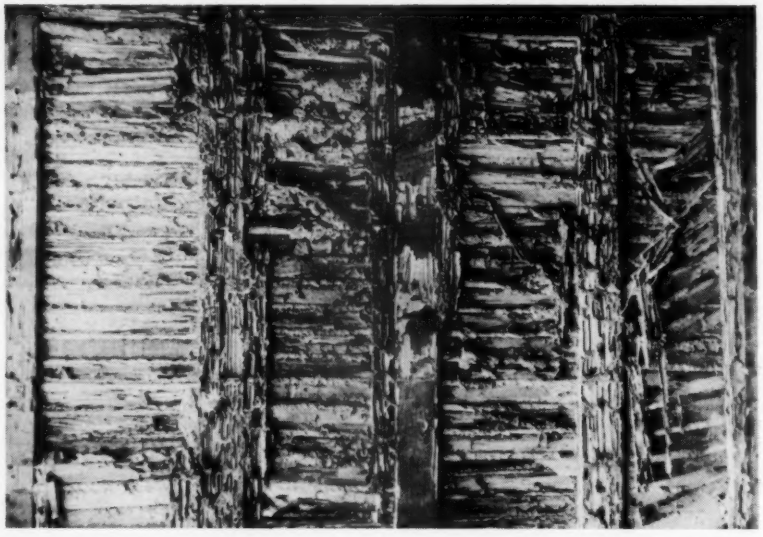
Here's the way PCOs answered the question about the pressure they use in their soil treating practices, with the percentage of those who said they use the pounds per square inch listed:

20-40 lbs. 15%	125 lbs. 4%
50 lbs. 10%	150 lbs. 14%
60 lbs. 8%	175 lbs. 1%
75 lbs. 16%	200 lbs. 10%
100 lbs. 20%	300-400 lbs. 2%

From the above tabulation, it is apparent 69% chose 100 lbs. or less pressure and that the greatest preference is in the range of from 75 to 100 lbs. psi.

Equipment used to develop these pressures likewise varies, but over 25% of those queried replied that their pumps put out from 100 to 125 lbs. psi. Of the other respondents, 15% said their pumps develop from 150 to 175 lbs. psi; 13% said 60 to 75 lbs. psi; 11%-200 lbs. psi; and the remainder went from one extreme of 25 to 50 lbs. psi to 750 lbs. psi.

Experts recognize no one standard soil-treating method, or piece of equipment, is going to be suitable for every situation in every geographical section of the country, but a "preferred" set of recommendations is in the process of being developed for climatic and soil conditions typical in specific areas of the USA. This is a project of the NPCA and results will be made available to its members.



Lightning strikes Nebraska house; uncovers thousands of termites. This photo, taken by C. B. Morgan who runs Dependable Pest Control Co. in Englewood, Colo., was taken on the west side of a house struck by lightning at the chimney, ripping off the siding. The disaster proved to be greater than that caused by the electrical catastrophe. As the picture shows, the lath and studding were completely gone. Before the storm, the siding, which hid this termite-riddled devastation, appeared to be in perfect condition, never revealing what was going on underneath.

Spray Drift Personal Hazard?

Common practice with many servicemen is to apply their sprays to soil, or interior walls, by holding the hose in front of them as they walk forward making their applications. When sprays are under high pressure, or nozzles are adjusted for a fan or mist spray, too often the applicator gets a back drift of the pesticide. Depending upon the kind of chemical being used this can be a hazard if the insecticide is not washed off immediately.

Simple way to minimize this unnecessary contact with spray drift is to walk away from the applications, that is spray and move backwards toward untreated areas. Naturally the applicator has to keep an eye out for obstacles so he doesn't trip over them. Where wind conditions blow the spray into the PCO's face, a respirator mask should be worn.

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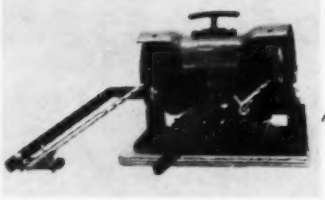

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Terminix Promotes PreTreats Through Local Builder

Wherever possible, members of the Bruce Terminix organization utilize the popularity of a local builder to gain publicity for its soil pretreatment service.

After a builder or contractor has been signed up to have the houses he is building pretreated against future termite attack, Terminix feels it not only helps promote their service, but also gives the contractor a boost. Real estate editors of newspapers are looking for local news and are receptive to a story that promotes new developments in their area. The newspaper is contacted, a picture is taken of both the Bruce representative and the builder, and the story is published to tell readers about the added protection being offered by XYZ builder.

Terminix promotes the guarantee it provides the builder who in turn assures the homeowner of freedom from termite troubles. The PCO's guarantee covers damage to rugs, carpets, and other furnishings, as well as the building itself. Terminix policy is backed by E. L. Bruce Co. through Sun Insurance Office, Ltd.

Newspapers, especially those in the South, are "most cooperative" in providing news stories to regular users of their advertising pages. Some papers even sell editorial space to make a news story, which is actually nothing more than an advertisement prepared in prose form, look like it was written by an unbiased news reporter.

Terminix's technique of utilizing the popularity of local builders improves the chances of getting space in community newspapers and sells more pretreat work by stimulating public demand for such protection.

Workers Find Termite Lure

The brown rot fungus, *Lenzites trabea*, has been found to be a powerful attractant to termites. Drs. G. R. Esenther, T. C. Allen, J. C. Casida, and R. D. Shenefelt of the University of Wisconsin and the U.S. Dept. of Agriculture Forest Service Research Station in Madison, tested the attracting powers of several kinds of fungi and found that neither healthy wood alone, nor fungus alone attract termites. But, in combination, wood and fungus made a very good lure.

Several different kinds of termites were tested on the brown rot fungus and within two minutes all had clustered around wood parts where *Lenzites trabea* growth was mature or "wooly." Extracts of this part of the wood attracted the insects even faster than the whole wood.

Dr. Anders E. Lund, research worker for Koppers Co., suppliers of chemicals to pressure-treat and thus protect lumber from attack, is working on an approach opposite to that of the Wisconsin entomologists. Lund is discovering some fungi repel termites.

Over a year ago (PC, June '60, pgs. 40-44) Lund reported he had found the wood-destroying fungus *Lentinus lepideus* had "a definite antagonistic influence" to termite attack. In one test, Dr. Lund found *Lenzites trabea* produced 100% mortality after 35 days to termites placed in Petri dishes containing a sterilized malt agar inoculated with the fungus.

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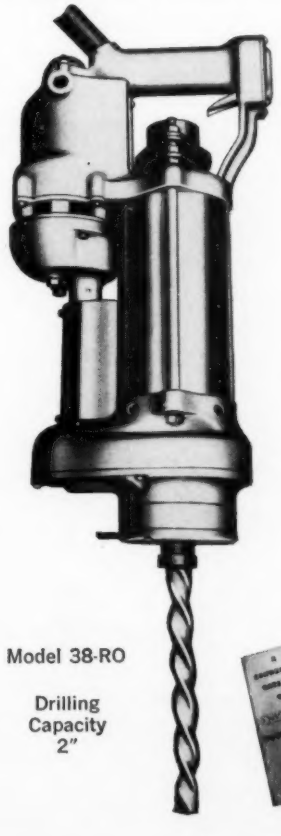

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The Syntron 38-RO Electric Hammer Drill is a heavy duty, 2" capacity unit, that is becoming the choice of exterminators everywhere.

The electromagnetic drive unit produces 3600 powerful blows per minute — drills clean holes quickly through concrete, stone, or masonry without manual quarter turning of drill bit—rotation is automatic. Simplicity of design assures life-long efficiency, dependability, and low maintenance.

Phone the nearest Syntron Representative for a free demonstration without obligation or . . . .

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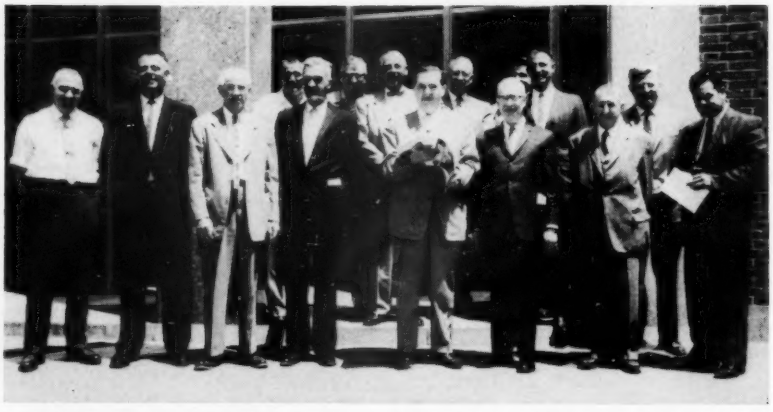
What's NEWS In The Industry

One Day A Week Short Course Given by Houston PC Assn.

In cooperation with the entomology department of Texas A&M College, the Houston Pest Control Association will hold a five-day short course on entomology spread over six weeks, meeting from 7 to 10 p.m. on Fridays in successive weeks, except one, beginning October 6th.

Lectures will be given at the County Court House in Houston, under the direction of Dr. J. C. Gaines, A&M entomology chief. A record attendance is anticipated not only from the Houston and Harris county area, but from a radius of over 100 miles from Houston. The course is open to any PCO or owner of a pest control business who wishes to register.

For complete details, write Fred Rodell, P. O. Box 8492, Houston, Texas.



Eastern PCO Conference planning committee met recently to decide on program topics to be included in the January 24-26 University of Massachusetts short course next year. Shown are (from left to right): Dr. Ellsworth Wheeler, Sidney Heal, Dr. Harry Sweetman, O. N. Anderson, Kenneth Cook, Dr. Frank Shaw, Charles Houghton, Joseph Harris, Dr. John Cully, Kenneth Thompkins, Wes Kelly, Aaron Fleischer, Prof. Arthur Bourne, Dr. John Becker, and C. A. Chafe, Jr. Heal, Anderson, Cook, Houghton, Harris, Thompkins, Kelly, Fleischer, and Chafe were industry members who conferred with the others who are members of the Mass. U. staff.

W. Va. PCOs Organize

An organizational meeting of the Pest Control Operators Assn. of West Virginia was held late in July at the Daniel Boone Hotel in Charleston. A constitution and by-laws were adopted by the 37 PCOs who attended and officers were elected. President is R. D. Erdie, Ace Exterminators, Fairmont; vice-president, M. A. Hylbert, West Virginia Terminix Co., Huntington; and secretary-treasurer is Robert Dean, Hygienic Sanitation Co., Cumberland, Md. A two-man board of directors includes R. D. Hill, Orkin Exterminating Co., Charleston, and J. W. McDonald, J & K Pest Control Co., Petersburg.

Consultants for the formation session were Dr. David Quinn, pathologist and entomologist at West Virginia University, who was made an honory member, and Robert L. Showalter of the NPCA, with assistance from Dr. Ralph E. Heal, NPCA executive secretary.

It was announced that Dr. Quinn hopes to prepare and conduct a PCO short course at the association's next meeting at W. Va. U. in Morgantown in January.

South Florida Pest Control Assn. elected these new officers at its annual meeting last month (standing left to right): James C. Crews, Floridian Pest Control, Miami; Alvin Burger, Burger Pest Control, West Miami; Riley Prince, Riley Prince Exterminators, Miami; (sitting, l to r) Robert L. Joyce, Miami; Fulton P. Greenberg, Fulton's Pest Control, North Miami Beach; and Tom Lear, Lear Pest Control Co., Miami. Lear is '61-'62 president.

PC Course Begins Sept. 27 at NY Community College, Brooklyn

A 14-week pest control training course for metropolitan New York city, in cooperation with the city's Health Department, will begin Sept. 27 at New York Community College in Brooklyn.

The course will be a pilot program initially, according to Richard Klemfuss, executive secretary of the Exterminating Industry Institute, Inc., in NYC. If successful it will be opened to non-commercial persons engaged in pest control work. Contents of the course is being regulated by Professor Selinger of NY Community College, Charles Whelan, chairman of the city's code committee govern-

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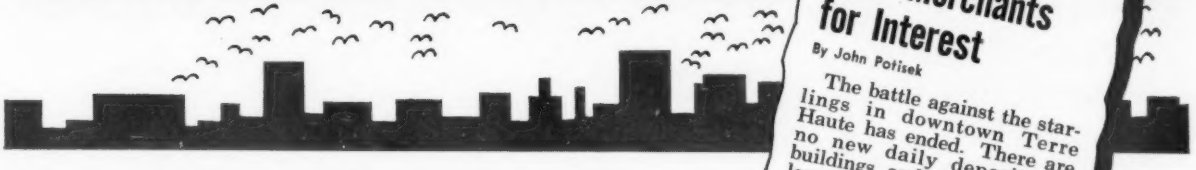

Starlings Are Exterminated; Laud Merchants for Interest
By John Potisek
The battle against the starlings in downtown Terre Haute has ended. There are no new daily deposits on buildings and the walks below them, and the passers-by no longer have fears of bombardments.
Making use of a ch
called Rid-A-Bird
says it has
plan. The
on the ro
penetrates
Reprinted from
TERRE HAUTE TRIBUNE,
March 1, 1961

For many years the downtown area of Terre Haute, Indiana, suffered from unsightly, unsanitary and costly conditions caused by pest birds. The Terre Haute Chamber of Commerce, Downtown Merchants Association, building owners and civic-minded citizens decided upon the Rid-A-Bird method for solving their bird problems.

The results were phenomenal! As Mr. John K. Lamb, Executive Vice President of the Terre Haute Chamber of Commerce said, ". . . the birds almost immediately disappeared from those areas which had been treated by the Rid-A-Bird method and at the end of the program there were no starlings visible in our downtown area at all."

More and more cities and towns are discovering for themselves the reasons why Rid-A-Bird insures guaranteed success. No awkward, complicated or mechanical devices to install or service, which give, at best, only temporary relief. (See newspaper inset.)

If your city has a pest bird problem in its shopping center or downtown area, it will pay you to investigate the Rid-A-Bird System now. It is *simple, safe* and *sure.*

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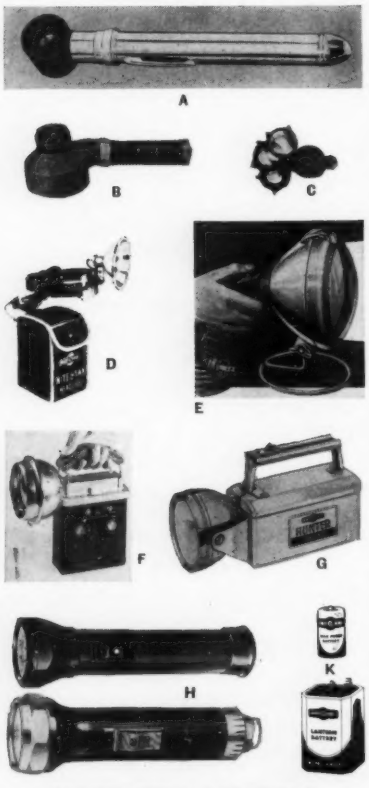

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ing pest control operations in Greater Manhattan, and a representative from the NY Health Department.

For further details, contact Richard Klemfuss, Exterminating Industry Institute, Inc., 131 West 42nd St., New York 36, N. Y.

Fitzwater Moves to New Mexico

William D. Fitzwater, assistant district agent for the Fish & Wildlife Service stationed at Purdue University for over 11 years, has been assigned to the Branch of Predator & Rodent Control regional office in Albuquerque, N.M.

In his new position, Fitzwater will serve as liaison between research and control operations in the states of Arizona, New Mexico, Texas, Oklahoma, Kansas, Utah, Colorado, and Wyoming.

Known to PCOs who have attended conferences at Purdue University, Fitzwater worked closely with the pest control industry. He has been a leader in developing methods of bird control and was one of the first to utilize recorded distress cries as a frightening measure. He has written many articles for PC readers.

Buell Named Wildlife Chief

Noble E. Buell, chief of the branch of predator and rodent control, has been promoted to become Chief of the Division of Wildlife of the Bureau of Sport Fisheries and Wildlife in the Fish & Wildlife Service, Washington, D. C., according to an announcement from the Department of the Interior by asst. secretary for Fish & Wildlife Frank P. Briggs. Buell succeeds Paul T. Quick who is now regional director of the Bureau's Pacific Region.

Having been with the Bureau since 1935, Noble Buell became predator and rodent control chief in 1957 and has appeared on the programs of several NPCA conventions.

Bob Russell Joins Delk

Robert Russell, long-time technical director for Orkin Exterminating Co., has left that position for a similar one with Delk Pest Control Co. in Fresno, Calif.

Notebook

TIPS AND IDEAS FROM THE FIELD

Lay Out the DDT Carpet For Winter Mice

By KOLLUM ROOLE

It won't be long before cold weather will be with us again. And that's when house mouse problems increase. We anticipate these troubles and begin early to minimize them.

Before the arrival of cold weather, we get ready for the movement of mice into the shelter of buildings, and greet them with a welcome mat in the form of a thin layer of 50% micronized DDT. It's an effective tracking powder. Mice get the DDT on their feet and fur and, as they clean themselves, consume lethal amounts. We've found rats are not visably affected by these applications.

Do not place the DDT powder near foods of any kind to avoid possible contamination. But you can dust the powder in many out-of-the-way places, such as on the flat surfaces of joists and sidewall plates in warehouses, or along walls in rooms where mice run.

The DDT powder can be protected in factory type warehouses, barns, etc. by placing it in 2- to 4-foot sections of galvanized rain pipe, or boards can be set at an angle against walls to protect powder that's been scattered on the floor beneath them.

On jobs where you've got the total responsibility for keeping insects and rodents out, this extra pre-winter precaution doesn't need to cost you extra service time. Schedule it in advance as part of work to be done on one of your routine monthly service calls.

Elzinga Kans. Entomologist

Dr. Richard J. Elzinga became assistant professor of entomology at Kansas State University, according to department head, Dr. Herbert Knutson.

Elzinga, who holds three degrees from the University of Utah, will teach courses in general entomology and the structure of insects. He has done research on mites, lice, ticks, and fleas of rodents, as well as mosquito biology.

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4 oz. Throw Bags 1 case — 25 lbs. (100 bags)	$13.50 per case Plus Freight	**$10.75 per case Delivered**

For Even Greater Savings . . .

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3 cases, 75 lbs. . . . (300 bags) . . $27.00 del. 8 cases, 200 lbs. . . (800 bags) . . $64.00 del.

	WAS	NOW
5 lb. Bags (6 per case)	$10.50 per case Plus Freight	**$10.50 per case Delivered**

For Additional Savings . . .

2 cases . . . $19.25 delivered 3 cases . . . $25.25 delivered 6 cases . . . $45.00 delivered

In Bulk — 100 lb. Drum WAS $21.00 per drum Plus Freight **NOW $21.00 per drum Delivered**

For *Extra* Economy . . . 200 lb. drum — $39.00 Delivered

PMP® 1% CONCENTRATE, *Still* the Low Priced Concentrate!

Mix 1 lb. of concentrate to 19 parts of suitable bait material.

2½ lb. cans (makes 50 lbs. of bait) (6 cans per case) $12.75 per case Delivered
25 lb. drum . . . . . $18.75 Delivered
50 lbs. . . . . $35.00 — 100 lbs. . . . . $65.00 Delivered

PMP® TRACKING POWDER

Highly successful where edible baits fail — effective as a clean-up measure for marginal feeders.

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PMP® WATER SOLUBLE BAIT

	WAS	NOW
1⅓ oz. can — makes 1 qt. liquid bait — (24 per case)	$4.80 per case Plus Freight	**$4.25 per case Delivered**
3⅓ oz. can — twice as strong as above — makes 1 gal. liquid bait (24 per case)	$9.60 per case Plus Freight	**$6.75 per case Delivered**

Reduced Prices on Bulk Water Soluble Bait On Request.

LIQUID BAIT DISPENSER (12 per case)
WAS $7.92 per case Plus Freight
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MOUSE BAIT STATION
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Sure Shot CO_2 cartridge sprayers come in 2 models: Model A, 1-qt. capacity (shown), and Model C has a 6-oz. capacity. Both are of all metal construction. The larger version has rigid and flexible nozzle extensions available, while the smaller one can be outfitted with an auxiliary pressure hand pump, nozzle extension, and pocket spring clip. Both are normally air-charged by standard compressed air chucks or auxiliary carbon dioxide bombs. Complete data is available from Milwaukee Sprayer Mfg. Co., 2437 W. Fond du Lac Ave., Milwaukee 6, Wisconsin.

Geigy Holds Diazinon Clinics

"PCO Road Show Clinics" is the title given to the Diazinon-promotion meetings being held by Geigy Agricultural Chemicals Co. in various cities throughout the country.

Aimed primarily to get PCOs to understand better the many uses for Diazinon, the Geigy clinics are carefully planned educational sessions which feature excellent colored slides on roach identification and control methods. A colorful flannelgraph presentation is augmented by three technical representatives who present facts in their area of specialty.

At one meeting, Geigyman Haskel Tyson said experts expect the size of the pest control industry to double in 10 years when it will be doing over a billion dollars volume annually.

Diazinon is claimed to be a wide spectrum insecticide useful to control fleas, chiggers, ants, silverfish, roaches, and flies. A product which is reported to be gaining in PCO use is Diazinon 2D, an inert dust formulation.

Dr. Homer Fairchild, Geigy entomologist supervising sales and service to the pest control industry, takes part in many of these regional invitational PCO clinics. He said, "Too much sanitation in some places is washing away residual insecticides. In such instances reapplications must be made, and this can be expensive. This wash-away loss can be reduced if insecticides are concentrated in areas where insects enter and in their breeding places, rather than solely in places where they travel, places that may be frequently washed."

New Spraying Systems Bulletin

A complete presentation of spray nozzles, spray tips, hand valves, spray guns, foggers, and related equipment for pest control application is included in the illustrated Pest Control Spraying Equipment Bulletin 112 available free from Spraying Systems Co., 3221 Randolph St., Bellwood, Ill.

Ga. PCO developed bird repellent. Bird-Stop, an aerosol compound claimed to discourage the roosting or nesting of birds, is now available from Animal Repellents, Inc. Company president, Robert D. Dixon said the product was developed by Athens, Ga. PCO Ernest Boland who runs Boland Bonded Pest Control Co. and has been marketed in his state since 1957. Bird-Stop is said to be a white, foamy compound which birds find tacky and disagreeable underfoot. It does not harm or entangle birds, is odorless, and will not stain, the manufacturer says. One aerosol can will treat approximately 110 linear feet. For descriptive literature and prices on Bird-Stop, write Mr. Dixon at Animal Repellents, Griffin, Ga.

WARF Reader's Digest Ads

Warfarin is to be promoted through a full-page advertisement in the October '61 U.S. and Canadian editions of the Reader's Digest and again in the Lake States and North Central editions of RD in January 1962. This is believed to be the first time an anticoagulant rodenticide has been given such extensive, nation-wide promotion.

Latest CDC PC Courses

Six insect and rodent control training courses will be given by the Communicable Disease Center of the U. S. Public Health Service in Atlanta, Ga. during the next nine months. Anyone engaged in pest control work is eligible to attend, but the number of students that can be accommodated in each course is limited, according to Dr. Harry D. Pratt, chief of the CDC's insect and rodent control training section.

These are practical training sessions often with instruction taking place in the field.

Dates and courses to be given are:

Sept. 11-22: Insect Control, Course No. 203

Sept. 25-Oct. 6: Rodent Control, Course No. 211

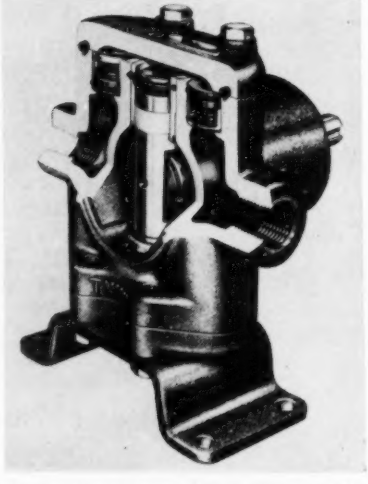
Nov. 6-10: Mosquito Control, Course No. 231

Jan. 8-19, '62: Identification and Biology of Arthropods, Course No. 241

Feb. 12-16: Epidemiology and Control of Vector-Borne Disease, Course No. 201

June 4-15: Insect and Rodent Control, Course No. 221

For registration information, write Dr. Pratt at the Communicable Disease Center, Atlanta 22, Georgia.



Direct motor driven piston pump that will operate at pressures up to 500 lbs. is new from Hypro Engineering, Inc., 700 39th Ave., N. E., Minneapolis 21, Minn. Weighing 9 lbs., this Hypro Small-Twin Model 5300, two-cylinder piston pump, comes in 2 sizes: 2 gal. per. min. and 3 gpm, at a maximum speed of 1800 RPM. Body is of cast iron, with stainless steel valves, Ni-Resist cylinder sleeves and plastic-impregnated leather piston cups. Ports are tapped ½" NPT; stainless steel shaft is ⅝" diameter with keyway, and 2 heavy-duty sealed ball bearings support the stainless steel drive shaft. Write to Hypro if you would like more information on this new pump.

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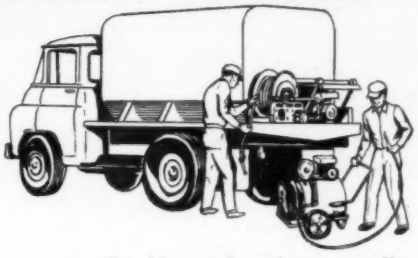
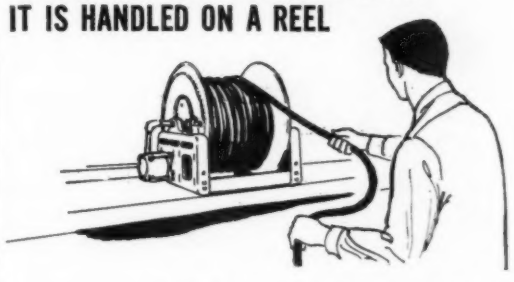
REELS REDUCE HOSE HANDLING TIME ON EVERY TYPE EQUIPMENT



On big truck units or small, cart-type sprayers, you can pay out and rewind hose faster with a reel than by any other method. Liquid or gas is always ready at the nozzle, whether you use only a few feet or the entire length of hose. Hose coiled on the reel requires less space than other coiling arrangements.

YOUR HOSE LASTS LONGER WHEN IT IS HANDLED ON A REEL



Hose replacement costs go down because hose damage from kinking, abrasion and cutting is reduced to a minimum by using a reel. Tru-circle drums and rolled disc edges on Hannay reels provide maximum hose protection.

YOU CAN BOOST YOUR PROFITS BY USING REELS FOR HOSE HANDLING

Time is a big cost factor on every job, and inefficient hose handling is a big time consumer. The minutes you save by using reels mean a lower cost per job and greater profits for you.

You'll find the right reel to meet your hose handling problem in the big Hannay Catalog. Send the coupon today for complete information.

Please send catalog and information on hose reels for pest control service.

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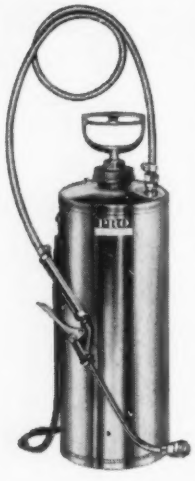

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The new PRO Sprayer line is designed expressly to meet PCO requirements. PRO Sprayers are available only to PCO's. Over 50 years experience manufacturing sprayers and dusters makes Root-Lowell a real "Pro"

Write today for Catalog #90 issued only to the professional Pest Control Operator. It features the complete PRO Sprayer line plus many other Root-Lowell sprayers and dusters ideal for both use and resale.

908 PRO®—Stainless Steel Sprayer

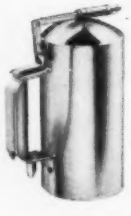
Stainless steel tank, 2 gallon usable capacity. Smooth stroking seamless brass pump easily removed for fast filling. Positive dripless nozzle shutoff. 4 ft. hose with exclusive steel braided hose cover and vinyl tubing liner. Shut-off has easy clean Monel strainer. 9" angled extension with fan-pattern nozzle quickly removed from shut-off valve housing.

925 PRO®—Stainless Steel Sprayer

2 quarts usable capacity; stainless tank (2½ qts. full capacity). Has same general features as 908 sprayer illustrated above. 3 ft. stainless steel braided hose with vinyl lining. All parts are easily removed and cleaned.

904 PRO®—Stainless Steel Sprayer

Stainless steel tank with one gallon usable capacity. High output seamless brass pump, and spring-loaded dripless shut-off valve. 4 ft. hose with steel braided cover and vinyl tubing liner. 9" angled extension and fan-pattern nozzle. Shut-off uses easy clean Monel strainer. Also comes in Model 9041, same as 904, but has Multeejet nozzle instead of fan-pattern.



901 PRO®—High Pressure Sprayer

32 ounce stainless steel precision tool for all commercial uses requiring small portable high pressure unit. Will stand up to 400 lbs. pressure. Nickel-plated bronze nozzle and whirl plug. Thumb shut-off valve trigger for positive spray control. Nozzle clean-out plug and extra whirl plug store beneath handle. Easily recharged from hand pump or compressed air line.

902 PRO®—Chemical Sprayer

Corrosion resistant stainless steel 2 gallon tank, with electric welded seams. Easy stroking 1¾" x 10" seamless brass plunger with faultless valve. Sure-Seal cam lock with safety release. Air regulation valve assures quick, accurate control of air and solution mix. All brass nozzle with #70 hole.

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903 PRO®—Chemical Duster

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Chemagro's Bayer 29493 Now Entex; Registered for PCOs

Entex is the new name for Bayer 29493, an organic phosphate insecticide with moderate toxicity made by Chemagro Corp., Box 3913, Kansas City 20, Mo. It has been registered for PCO use in homes, etc., to control roaches, flies mosquitoes, wasps, and crickets.

Actually, Bayer 29493 will be known by two names: Entex for PCO use; and Baytex when it's applied in the fly and mosquito control field. Regardless of its trade name, it chemically is 0,0-dimethyl 0-[4-(methylthio)-m-tolyl] phosphorothioate. It is a brown liquid, soluble in most organic solvents, but not in water.

Entex is said to be structurally different from most household insecticides and some experts believe the chemical might be used if resistance develops to other materials employed for fly and roach control. The NPCA says long residual activity has been indicated by laboratory experiments as well as field work with 3% Entex in oil. Emulsion formulations have not been tested long enough to form an opinion about their residual effectiveness.

The NPCA reported to its members that "Limited experience by our Insecticide Committee with Entex indicates that as a 3% oil solution it provides excellent control of German roaches without objectionable odor, staining, or irritation." The wettable powder is said to leave a powdery residue indoors

Use limitations require that Entex not be applied as a space spray indoors; must not be sprayed in dairy barns or poultry houses, nor in areas where children or pets can come in direct contact with treated surfaces. Excessive wetting of asphalt tile, rubber, and plastic materials should be avoided with emulsions and oil sprays. Personal safety precautions observed with other organic phosphate insecticides must also be followed when Entex is used.

Entex is registered as an emulsifiable concentrate, a 25% wettable powder, a 3% oil solution, and 5% granules. It will be available through several suppliers soon, Chemagro advises.

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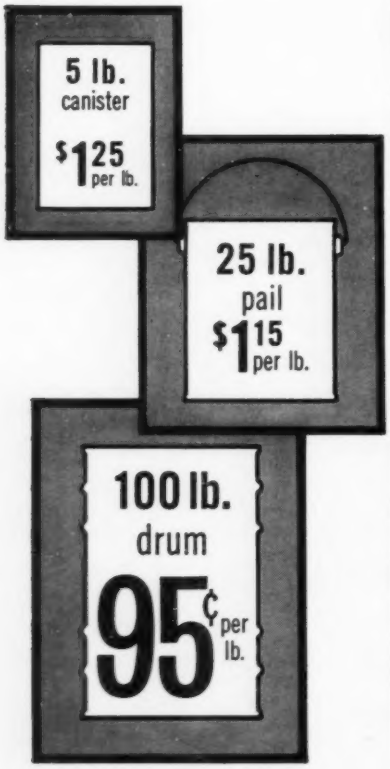

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Calendar

Insect Control Training Course, Communicable Disease Center, Atlanta 22, Ga., Sept. 11-22.

Indiana Pest Control Assn. Meeting, Lincoln Hotel, Indianapolis, Sept. 12-13.

Professional Pest Control Assn. of Dallas County Monthly Meeting, El Chico Restaurant, Sept. 14, 7 p.m.

Alabama Pest Control Assn. Annual Meeting, Whitley Hotel, Montgomery, Sept. 15, 16.

Washington, D. C., Pest Control Assn. Meeting, 4904 Wisconsin Ave., N.W., Sept. 18., 8 p.m.,

Canadian Agricultural Chemicals Assn. 9th Annual Meeting, Mont Tremblant Lodge, Mont Tremblant, Quebec, Sept. 18-20.

Alabama PCO Licensing Exam. Agricultural Bldgs., State Fair Grounds, Birmingham; Courthouse, Decatur; Courthouse, Gadsden; State Vocational School, 925 Fulton Rd., Mobile; 882 State Office Bldg., Montgomery, Sept. 19, 8 a.m.

Maryland Pest Control Assn. Monthly Meeting, Lord Baltimore Hotel, Baltimore, Sept. 20, 6:30 p.m.

New Jersey Pest Control Assn. Monthly Meeting, Entomology Bldg., Rutgers University, New Brunswick, Sept. 20, 8 p.m.

Pennsylvania Pest Control Assn. Joint State Meeting, Allenberry Inn, Boiling Springs, Sept. 22, 23.

Tennessee Pest Control Assn. Annual Meeting, Riverside Hotel, Gatlinburg, Sept. 22-23.

Exterminating Industry Institute, "Advertising & Marketing," National Democratic Club, New York City, Sept. 25, 8 p.m.

Texas Pest Control Assn. Quarterly Meeting, Beaumont, Sept. 22-23.

Pest Control Assn. of South Florida, Monthly Meeting, Lindsey Hopkins Vocational School, Miami, Sept. 25, dinner 6:45 p.m.; meeting 8 p.m.

Rodent Control Training Course, Communicable Disease Center, Atlanta, 22, Ga., Sept. 25 - Oct. 6.

Hawaiian Pest Control Assn. Monthly Meeting, Evergreen Restaurant, Honolulu, Sept. 26, 7 p.m.

Iowa Pest Control Assn. Meeting, Manhattan, Sept. 28-29.

Houston Pest Control Assn. Lecture Series, County Court House, Houston, Texas, Oct. 6, 20, 27, Nov. 3, 10; 7-10 p.m.

National Pest Control Assn. 28th Annual Convention & Trade Show, Deauville Hotel, Miami Beach, Fla., Oct. 15-19.

Washington, D. C., Pest Control Assn. Meeting, 4904 Wisconsin Ave., N.W., Oct. 16, 8 p.m.

Hawaiian Pest Control Assn. Monthly Meeting, Pali Palms Hotel, Kailua, Oahu, Oct. 24, 7 p.m.

National Agricultural Chemicals Assn. 28th Annual Meeting, The Homestead, Hot Springs, Va., Oct. 29-Nov. 1.

Missouri PCO Short Course, University of Missouri, Student Union Bldg., Columbia, Nov. 6-7.

Mosquito Control Training Course, Communicable Disease Center, Atlanta 22, Ga., Nov. 6-10.

V. P. I. PCO Short Course, Virginia Polytechnic Institute, Blacksburg, Nov. 8-10.

Nebraska Assn. of Pest & Termite Control Operators, Inc. Annual Meeting and Short Course. Town House Motel, Omaha, Nov. 16, 17.

Texas Pest Control Assn. Annual Convention, Fairway Motel, McAllen, Nov. 16-18.

Ohio Pest Control Assn. Annual Meeting, Commodore Perry Hotel, Toledo, Nov. 29-Dec. 1.

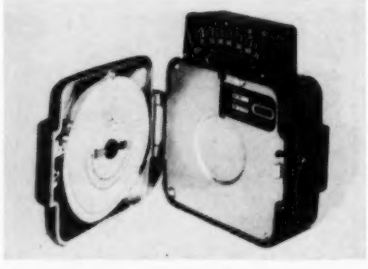
Illinois Pest Control Management Workshop, University of Illinois, Urbana, Dec. 5-8.

PCOs of California, Inc. Cal-Poly Conference, Cal-Poly Institute, Pomona, Dec. 16.

New FDA Cocoa Bean Rules

New sanitary requirements for imported cocoa beans will be applied by the Food & Drug Administration beginning February 22, 1963.

Under the new requirements, shipments of cocoa beans offered for entry into the United States must not contain more than 6% moldy and insect infested beans, and not more than 3% of either moldy or insect infested, including insect damaged, beans. Under previous requirements, in existence since 1933, cocoa beans containing up to 10% moldy and wormy beans, but not more than 5% moldy beans, have been allowed to be imported.



A year's guarantee is now being offered on all 7 models of the Servis Speed Recorders, according to Kenneth A. Cool, president of Service Recorder Co., 1013 Rockwell Ave., Cleveland 14, O. The guarantee also covers the new visible speed recorders, both MPH and RPM models one of which is illustrated above. The visible recorders are designed for use when speedometers or tachometers are not desired. MPH models record speed, time, and mileage on charts covering 24 to 72 hour periods. RPM models, for use on diesel trucks, show engine speed and time. Dial is eluminated by 2 lights wired to the dash light switch. A wire seal prevents tampering with the recorder dial.

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"Vapona" 0.5% pressurized spray, solution, and emulsifiable concentrate have been passed for nonprofessional use in households, restaurants, theatres, food processing plants, warehouses, etc., according to word from Shell Chemical Company.

Data sheets giving use information and a specimen label for 0.5% "Vapona" insecticide pressurized spray are available from Shell's Agricultural Chemicals Division, 110 West 51st St., New York 20, New York.

Residex Has Entex

Entex, new name for the recently registered-for-PCO-use Bayer 29493, is now available from Residex Corp., according to company representative Richard Sameth.

It is claimed Entex has an acceptable odor, so far has not caused any staining, and appears to be residually effective against roaches. The organic phosphate is available from the company as an emulsion concentrate containing 4 lbs. technical material per gallon.

New Residex aerosol is "Fly Fog" said to be specially designed for use in food processing establishments. Packaged in a 2½ lb. disposable container, Fly Fog will treat approximately 800,000 cubic feet at minimum dosage for flies and has a delicate fragrance, the manufacturer says. For details write Residex Corp., 225 Terminal Ave., Clark, N. J.

Detailed information on Entex is available from Residex Corp., 225 Terminal Ave., Clark, N. J.

Pigeon Control

(*from page 20*)

histoplasmosis). Ann. Soc. Roy. Sci. Med. Natl. Brux., *11*(2): 282-304 (In Belgian).
Baker, E. W., Evans, T. M., Gould, D. J., Hull, W. B., and Keegan, H. L. 1956. A manual of parasitic mites of medical or economic importance. Tech. Publ., Natl. Pest Control Assoc., Inc., New York, v + 170 pp.
Blackmore, J. S., and Dow, R. P. 1958. Differential feeding of *Culex tarsalis* on nestling and adult birds. Mosquito News, *18*(1): 15-17.
Bol, C. J. 1959. (Contagious diseases in the pigeon). Tijdschr. Diergeneesk., *84*(18): 988-1004 (In Dutch).
Buchka, E. 1958. (Competition in pigeon lofts). Prakt. Schadlingsbekampfer, *10*(5): 57-58 (In German).
Das, M. S., Chakravorty, M. B., and Ghosh, G. K. 1959. Occurrence of avian salmonellosis in West Bengal. Indian Vet. J., *36*(9): 403-408.
Deoreo, G. A. 1958. Pigeons acting as vector in acariasis caused by Dermanysus gallinae (Degeer, 1778). Arch. Dermat., *77*(4): 422-429.
Emerson, K. 1957. A new species of Mallophaga from the pigeon (with a key to commonly occurring species of Mallophaga). Florida Ent., *40*(2): 63-64.
Emmons, C. 1955. Saprophytic sources of *Cryptococcus neoformans* associated with the pigeon (*Columba livia*). Amer. J. Hyg., *62*(3): 227-233.
Engelmann, C. 1958. (Studies on food choice of pigeons). Arch Geflugelzucht. u. Kleintierk., *7*(1-2): 90-95. (In German).
Fazekas, G., and Schwarz, J. 1958. Histology of experimental murine cryptococcosis. Amer. J. Path., *34*(3): 517-529.
Feldman, W. H. 1947. Animal tuberculosis and its relation to the disease in man. Ann. N.Y. Acad. Sci., *48*: 469-505.
Fitzwater, W. D. 1959. Bird repellents. Pest Control, *27*(3): 39-40.
Fothergill, L. D., and Dingle, J. H. 1938. A fatal disease of pigeons caused by the virus of the eastern variety of equine encephalomyelitis. Science, *88*: 549.
Furcolow, M. L., and Ney, P. E. 1957. Epidemiologic aspects of histoplasmosis. Amer. J. Hyg., *65*(3): 264-270.
Galton, M. M., and Arnstein, P. 1960. Poultry diseases in public health. U. S. Public Health Service, Communicable Disease Center, iii+40 pp.
Gerriets, E. 1958. (The choice of fowl pox or pigeon pox virus vaccine for immunizing fowls). Dstch. tierarztl. Wschr., *65*: 244-246 (In German).
Gibson, C. L., and Eyles, D. E. 1957. *Toxoplasma* infections in animals associated with a case of

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human congenital toxoplasmosis. Amer. J. Trop. Med., *6*(6): 990-1000.

Grayston, J. T., and Furcolow, M. L. 1956. Epidemics of histoplasmosis. Public Health Monogr., No. 39, U. S. Govt. Print. Off., Washington, D.C., pp. 39-45.

Hammon, W. McD. 1948. Isolation from wild bird mites (*Liponyssus sylviarum*) of a virus or mixture of viruses from which St. Louis and western equine encephalitis viruses have been obtained. Science, *107*: 92-93.

Harris, K. L. 1959. Sanitation aspects of food contamination by birds. Natl. Pest Control Assoc., Tech. Release, pp. 1-7.

Harris, K. L. (Editor) 1960. Microscopic-analytical methods in food and drug control. Food and Drug Tech. Bull. No. 1, U. S. Govt. Print. Off., Washington, D. C., v + 255 pp.

Hicks, E. A. 1959. Check-list and bibliography on the occurrence of insects in birds' nests. Iowa State Coll. Press, Ames, 683 pp.

Hockenyos, G. L. 1959. Handling localized pigeon problems. Natl. Pest Control Assoc., Tech. Release, No. 8-59, pp. 1-3.

Hockenyos, G. L. 1960. Driving starlings from Springfield. Pest Control, *10*(28): 11-12, 16, 18, 20.

Hwang, J. C. 1959. Case reports of the quill mite, *Syringophilus bipectinatus* in poultry. Proc. Helminthological Soc. Washington, *26*(1): 47-50.

Inaba, Y., Omori, T., Morimoto, T., Kurogi, H., Kono, Y., Ishii, S., and Matumoto, M. 1958. Psittacosis virus in Japanese pigeons. Japanese J. Exp. Med., *28*(3): 213-242.

Jacob, E. 1957. (Transmission of salmonellosis to man by feral pigeons). Dstch. tierarztl. Wschr., *64*(24): 596-597. (In German).

Kaeo, C. J. and Schwarz, J. 1957. The isolation of *Cryptococcus neoformans* from pigeon nests, with remarks on the identification of virulent cryptococci. Amer. J. Clin. Path., *27*(6): 652-663.

Kalkowski, W. 1958. Experimental investigations on the behavior and activity of pigeons during the partial solar eclipse on 30th June, 1954. Acta. Biol. Expt., *18*: 5-28.

Kalmbach, E. R. 1954. Pigeon, sparrow and starling control. Pest Control, *22*(5): 9-12, 31-32, 54; and *22*(6): 32-40.

Kissling, R. E. 1958. Host relationship of the arthropod-borne encephalitides. Ann. N. Y. Acad. Sci., *70*: 320-328.

Lee, D. B. 1958. Mosquitoes transmit fowlpox. Australian Vet. J., Aug. 1958: 230.

Lerche, C. 1958. The prevalence of ornithosis antibodies among patients in Oslo city hospitals. Chest Diseases, *12*(1) (XV): 27.

Levi, W. M. 1943. Pigeon raising. Boy Scouts of Amer., Merit Badge Ser. No. 3369, vi + 32 pp.

Levi, W. M. 1957. The pigeon (revised edition). W. M. Levi, Sumter, S. C. 667 pp.

Littman, M. L. and Schneierson, S. S. 1959. *Cryptococcus neoformans* in pigeon excreta in New York City. Amer. J. Hyg., *69*: 49-59.

Meyer, K. F. 1959. Some general remarks and new observations on psittacosis and ornithosis. Bull. World Health Org., *20*(1): 101-119.

Michelsen, W. J. 1959. Procedure for studying olfactory discrimination in pigeons. Science, *130*: 630-631.

Nazarov, V. P. 1958. (Diseases of pigeons). Moskva, Gosudarvennoe Izdatelstvo Selsk. Lit., 55 pp. (In Russian).

Neff, J. A. 1959. Controlling English sparrows by means of poisoned baits. Natl. Pest Control Assoc., 9-59, pp. 1-6.

Oderkirk, G. C., and Fitzwater, W. D. 1958. Bird control in food storage areas and pigeon trap plan. U. S. Dept. Interior, Fish and Wildlife Serv., 2 pp.

Oderkirk, G. C., and Fitzwater, W. D. 1958. Vagrant domestic pigeons. U. S. Dept. Interior, Fish and Wildlife Serv., 2 pp.

Parrott, T., Taylor, G., Poston, M. A., and Smith, D. T. 1955. An epidemic of histoplasmosis in Warrenton, N. C. Southern Med. J., *48*(11): 1147-1150.

Potts, R. M., and Womeldorf, D. J. 1960. Pigeon control in Fresno. California Vector Views, *7*(10): 59-62.

Rakshpal, R. 1959. On the behavior of pigeon louse, *Columbicola columbae* Linn. (Mallophaga). Parasitology, *49*(1-2): 232-241.

Rand, A. L. 1959. Pity poor pigeon: Host to a community. Chicago Natl. Hist. Mus. Bull., August 1959, pp. 6-7.

Recht, P. 1955. (Epidemiological measures against ornithosis). Acta Tuberc. Belg., *46*(3): 235-244 (In Belgian).

Reeves, W. C. 1947. Recovery of western equine encephalomyelitis virus from wild bird mites (*Liponyssus sylviarum*) in Kern County, California. Science, *105*: 411-412.

Reid, R. L. 1958. Discrimination-reversal learning in pigeons. J. Comp. Physiol. Psychol., *51*(6): 716-720.

Roberts, M. F. 1956. Pigeons. T. F. H. Publications, Inc., Jersey City, N. J., 24 pp.

Rodriquez, J. L., and Richl, L. A. 1959. Malathion dust for the control of two species of pigeon lice. J. Econ. Ent., *52*(4): 772.

Sabin, A. B. 1956. An epidemic of military granulomatous pneumonitis caused by *Histoplasma*. Public Health Monogr., No. 39, U. S. Govt. Print. Off., Washington, D. C. pp. 20-23.

Sasa, M., and Shingae, H. 1958. Occurrence of the mite *Dermatophagoides scheremetewskyi* Bogdanoff, free-living in albumine tannate stored in dispensaries. Japanese J. Exp. Med., *28*(1): 1-10.

Scott, H. G. 1959. Pigeons: Their public health importance and control. U. S. Dept. Health, Education, and Welfare, Public Health Service, 4 pp.

Schwarz, J., Baum, G. L., Wang, C. J. K., Bingham, E. L., and Rubel, H. 1957. Successful infection of pigeons and chickens with *Histoplasma capsulatum*. Mycopathologia (Amsterdam), *8*(3): 189-193.

Schurmann, E. 1958. (The choice of fowl pox or pigeonpox virus vaccine for immunizing fowl.) Dstch. tierarztl. Wschr., *65*: 242-244. (In German).

Smith, M. G., Blattner, R. J., and Heys, F. M. 1944. The isolation of the St. Louis encephalitis virus from chicken mites (*Dermanyssus gallinae*) in Nature. Science, *191*: 381.

Sorensen, P. M. 1955. (An epidemic of ornithosis occurring in a rural practice with probably interhuman transmission). Ugeskr. Laeg., *117*(35): 1152-1153. (In Danish).

Sulkin, S. E. 1945. The recovery of equine encephalomyelitis virus (western type) from chicken mites. Science, *100*: 362-363.

Terzin, A. L., Fornazaric, M. R., and Haaca, D. M. 1957. (Certain findings in connection with psittacosis-ornithosis). Higijena, *9*(2-3): 216-224. (In Serbo-croatian).

Thomas, I. 1957. The natural and artificial control of vertebrate pests of agriculture. Great Britain Forestry Comm. J., *26*: 138-143.

U. S. Department of Agriculture. 1960. Squab raising. U. S. Govt. Print. Off., Farm. Bull. 684, ii + 22 pp.

U. S. Public Health Service. 1956. Histoplasmosis from pigeon manure. Communicable Disease Summary, Natl. Office Vital Stat., *5*(17 May 1956).

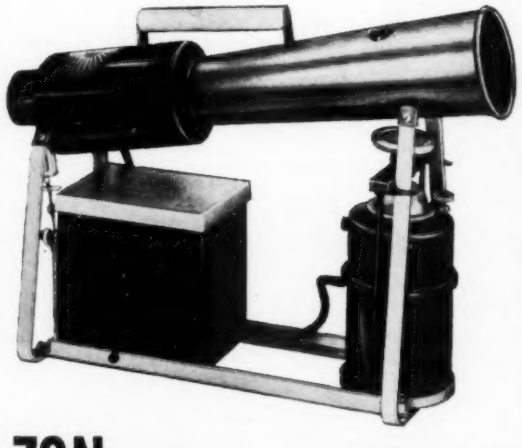
U. S. Public Health Service. 1957. Newcastle disease. Morbidity and Mortality Weekly Rep., *6*(44): 2.

Winn, J. F., Palmer, D. F., and Kaplan, W. 1957. Development and persistence of western equine encephalitis virus antibodies in experimentally infected pigeons. Cornell Veterinarian, *47*(3): 337-343.

Womeldorf, D. J., and Mortenson, E. W. 1960. The Fresno pigeon control program. Calif. Dept. Public Health, Bureau Vector Control, Publ. M-3-60, 9 pp.

Zavadil, R. 1958. (*Eimeria* and *Capillaria* species in pigeons and the effect of piperazine citrate on *Ascaridia columbae*). Sborn. vys. Sk. zemedelsk. les. Brno, Ser. B, *6*(27): 87-106. (In Czech.).

Zeidburg, L. D. 1956. Soil studies. Public Health Monogr. No. 39, U. S. Govt. Print. Off., Washington, D. C., pp. 240-250.



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Infestation Report

Contains pertinent portions of the Department of Agriculture's Cooperative Economic Insect Report, material from university entomology departments and reports from readers. PCOs noticing infestations in their own areas are urged to communicate with *Pest Control* so their information may be added to this infestation report.

BLACK CARPENTER ANT
(*Camponotus pennsylvanicus*)
Rhode Island: Infesting houses in Providence, Providence County, and in South Kingstown, Washington County.

IMPORTED FIRE ANT
(*Solenopsis saevissima richteri*)
Florida: Found for the first time in Pinellas County during June. **Texas:** Reported for first time from Brazoria County; approximately 300 acres infested.

PAVEMENT ANT
(*Tetramorium caespitum*)
Maryland: Winged forms swarming in and around homes at several localities over State. **Rhode Island:** Winged forms observed generally over State.

CARPENTER BEE
(*Xylocopa virginica*)
Michigan: More than usual number of reports being received from Kalamazoo, Benton Harbor, Lansing and Muskegon.

KHAPRA BEETLE
(*Trogoderma granarium*)
Arizonia: Two new infestations found in state. One in Yuma Valley, Yuma County, and one in a large feed lot in Florence area, Pinal County.

ORIENTAL BEETLE
(*Anomala orientalis*)
Florida: Collected in baggage compartment of airplane at Tampa International Airport, Hillsborough County, on July 21. This is first specimen recovered from aircraft this season.

OLD-HOUSE BORER
(*Hylotrupes bajulus*)
Maryland: Larvae caused heavy injury to structural wood in a home at Baltimore.

A BAT BUG
(*Cimex pilosellus*)
Colorado: Has been a problem in some homes and now occurs in an office building in Ft. Collins, Larimer County.

PUSS CATERPILLER
(*Megalopyge opercularis*)
Oklahoma: Beginning to cause some concern to homeowners in Durant, Bryan County. Some chemical controls have been applied to prevent recurrence of outbreak of 1960.

A CERAMBYCID
(*Smodicum cucujiforme*)
Maryland: Heavily infesting oak timbers in a home at Gamber, Carroll County.

EARWIGS
New Jersey: Invading homes, generally in shore areas. **Pennsylvania:** Reported from many areas of State; presently household pests in several eastern counties.

FACE FLY
(*Musca autumnalis*)
Indiana: Shows evidence of adaptation as a household pest during summer in suburban areas. **North Carolina:** First report from Yadkin, Rutherford, McDowell and Burke Counties; populations widespread in McDowell County.

HOUSE FLY
(*Musca domestica*)
Georgia: Heavy populations in southern area. **Louisiana:** Unusually abundant and annoying throughout southern half of State. **Pennsylvania:** Numbers slowly increasing over State. **Vermont:** Increasing; a problem in some dairies.

MILLIPEDES
Alabama: Becoming a nuisance as a lawn and household pest throughout northern portion of State. Reported to occur in numerous populations in lawns; large numbers also found around foundations and in basements of many homes. **New Jersey:** Invading homes in large numbers. **Pennsylvania:** Very abundant in yards and homes in Lancaster and Franklin Counties. Continue to cause much annoyance in homes generally.

BLACK WIDOW SPIDER
(*Latrodectus mactans*)
Pennsylvania: Causing concern in new development in Warren County that is devoid of usual habitats for this species; several collected by children. Over 12 collected in new home development area involving about 12 properties on two streets. **Utah:** Unusually common about homes at Parowan, Iron County.

A BROWN SPIDER
(*Loxosceles reclusa*)
Kansas: Collected in Manhattan area, Riley County; appears to be very abundant.

TERMITES
Nevada: Several homes infested with *Reticulitermes spp.* in White Pine County; numerous inquiries received from Reno-Spark area, Washoe County. **Pennsylvania:** Unspecified species swarming in home in Warren County.

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POSITION WANTED

MANAGER, age 32, married, 12 years experience in termite and structural pest control, will assume responsible position, will relocate, northern states preferred. Box 599, Pest Control magazine.

MANAGER, B.S. 1950, age 37, 11 years experience in research, production, service and sales in pest control and agricultural chemicals. Edwin J. Pinigis, 111 Indian Drive, Pittsburgh 38, Pa.

HELP WANTED

MANAGER - SALESMAN. Need ambitious man 28-35 to develop sales for our pest control and cleaning compounds division. Job offers potential of becoming general manager and part owner of this business. Applicant should have experience in management and sale of pest control as well as sale of sanitary specialities. Excellent opportunity for self-starter. All replies held in confidence. Solvit Chemical Co., Inc., 3734 Speedway Rd., Madison 5, Wisconsin.

MANAGERS for branch offices. Rapidly expanding pest control firm requires men to manage offices. Must have initiative, sales ability and forcefulness. Excellent opportunity to become associated with progressive organization enjoying solid financial position. Salary and percentage. Submit complete data: age, education, experience, and other pertinent details, together with photo. All replies confidential. L. L. Crosby, President, Commonwealth Sanitation Co., 3506 Bigelow Blvd., Pittsburgh 13, Pa.

BRANCH MANAGER experienced in in food plant inspection and pest control to operate office in mid-eastern area. Box 600, Pest Control magazine.

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WILL BUY pest control businesses. We are ready to buy pest control companies to add to the Commonwealth group. We prefer to retain existing management and personnel, under lucrative profit-sharing arrangements offering unusual potentialities for greatly enhancing present income. All negotiations completely confidential. Write to Wm. L. Yockey, treasurer, Commonwealth Sanitation Co., 3567 Bigelow Blvd., Pittsburgh 13, Pa.

Dallas Assn. Has "First"; Elects Lady Its President

Mrs. Betty Sterry was elected president of the Independent PCOs of Dallas last month and is believed to be the first woman ever to hold such a position. Her husband, James Sterry, retired from the post this year. Together they run Aabco Pest Control Co.

Other officers chosen were: vice-president, Ernest Cantrell, Diamond Exterminators; secretary, B. D. Hoffman, Hoffman Pest Control; treasurer, C. D. Clayton, Lockwood Exterminators; and master-at-arms is W. G. Voorhees of DuPont Pest Control Co.

Mrs. Sterry is a member of the association sponsored evening class in entomology at Southern Methodist University.

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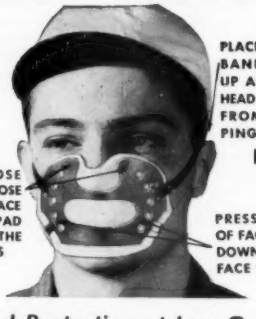

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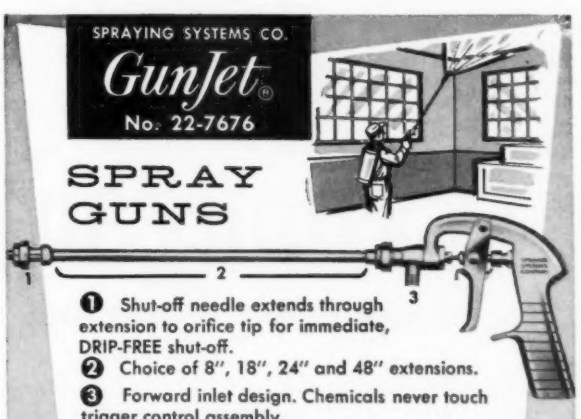

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Pestales

"No-Roost" goes international. One of the first shows in the newly-opened magnificent McCormick Place Exposition Center is the Chicago International Trade Fair that closed last month. Among the hundreds of exhibitors was Aegis Laboratories demonstrating its "No-Roost" bird repellent. Aegis prexy, Sam Grossman, was on hand most of the time explaining to visitors that his product is already used in Japan, Great Britain, Denmark, Australia, Brazil, and many other countries. Sam had helpful answers for most every international question regarding bird control, but what to do about tired feet had him speechless. Anyone who's manned an exhibit for 15 days like Sam did will know such duty is for the birds!

* * *

Coo-coo-ed Court. "Coo" is a well-known cockney exclamation. When a London judge's repeated order failed to repress it in the city's high court recently, he ordered the courtroom cleared. The offenders remained — two pigeons who eventually were chased out the window and justice was once more restored.

* * *

He's told 'em before. Elsewhere in this number we've reported that Fish and Wildlife man Bill "Fitz" Fitzwater is moving from one district office of the Branch of Predator & Rodent Control in Lafayette, Ind., to another in Albuquerque, New Mexico. We want to warn PCOs in the 8 southwestern states he'll be working in that some of his stories (to say nothing of his "unique" color slides) have been presented up North at Purdue conferences during the past decade or so. In fact, he's admitted, "I plan to become acquainted with PCO groups out West so I can dig up some of the old jokes I've told back here in hopes nobody will have heard them before out there." His stories aren't bad, but be sure to ask to see his slides of household pests.

* * *

Isn't this overdoing it . . . or too much of a good thing? We've just learned that the Timber Decay Bureau of London, England, has opened new offices there on Wormwood Street.

* * *

Wil-Kil man becomes teacher. Archer C. Wilcox, former director of food analysis and research laboratories at Wil-Kil Exterminator Co. in Milwaukee, Wisc. (now owned by Copesan) has been appointed associate professor of microbiology and chemistry at Milwaukee Downer College. Before joining Wil-Kil he had been a teacher at the University of Kansas.

* * *

Also for the Birds. Cleveland's properties director can't tell a "good pigeon" from a "bad pigeon" so he's not taking any chances. Ohio has as new law which permits the killing of pigeons if they are a nuisance on private or public buildings. But homing pigeons are still protected under the law, while common pigeons are fair game. And, besides, local law prohibits the discharge of firearms within the city limits. Any questions?

* * *

Uncommon Common Market? Theodore Riedeburg, one-time PC staffer and now New York agrichemical marketing consultant, has just returned from a two month junket to Europe studying the pesticide requirements in the Benelux countries, Germany, Switzerland, France, Italy, and the British Isles, most of which make up the European Common market. One thing we're sure he's discovered is that the market overseas has many angles uncommon to the US market. In particular, use-restrictions are practically unknown "over there."

* * *

A bit crowded? Received a notice recently that Harry L. Meyers of Terminix Company of Ohio, was to show a film entitled "The Intruder" which emphasizes the termite menance. A day or two earlier, we found on our desk a note from Frank Jefkins in London telling us about a new film on cockroach control called, "The Intruders." One thing is sure, somebody is intruding on somebody else.

* * *

Mrs. L. Gallardo, long-time general manager of Velsicol International's office on Bay Street in Nassau, of the Bahammas, retired from that post last month. Her many overseas friends will miss dealing with this charming lady.

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Kolker Methyl Bromide economically and quickly kills insects, mites, nematodes and related pests in all stages of their development.

Non-explosive and non-flammable, Kolker Methyl Bromide leaves no residual odors, tastes or stains, when used as directed.

Packaged in one-pound cans, 24 per case for domestic shipment and 48 per case for export. Also available in cylinders of 50, 100, 150 and 450 pound net capacity. It may be ordered as a 100% product or with 2% chloropicrin warning agent.

For further information on this highly effective fumigant write or call us today.

KOLKER CHEMICAL CORPORATION

600 Doremus Ave. • Newark 5, N. J. • MArket 2-4085

Pyrenone*...
PILLAR OF STRENGTH
for proud insecticide products!

FAIRFIELD BASE CHEMICALS	FAIRFIELD CONCENTRATES, BASES
PYRENONE	Combinations of piperonyl butoxide and pyrethrins in liquid and powder form.
PIPERONYL BUTOXIDE	TECHNICAL, DUST BASES
PYRETHRINS	EXTRACTS, DUSTS
ALLETHRIN	TECHNICAL, SOLUTIONS
ROTENONE	POWDERS, RESINS, SOLUTIONS, EMULSIFIABLE CONCENTRATES
CRAG FLY REPELLENT**	TECHNICAL, PYRENONE and CRAG FLY REPELLENT COMBINATIONS
TRIPLE MIX REPELLENTS	CREAMS, LIQUID
DRI-DIE***	TECHNICAL, DUST BASE COMBINATIONS
STROBANE†	SOLUTIONS
I. P. C. HERBICIDE	TECHNICAL

PRODUCTS MADE FROM FAIRFIELD BASES

Non-toxic fly sprays
Livestock insecticide repellent sprays
Pressurized insecticide fungicide plant sprays
Aerosol fly sprays
Metered aerosol insecticides
Back rubber formulations
Pyrenone-residual household sprays
Pressurized insecticides
Livestock insecticides
Pyrenone concentrated aerosols
Insect repellents
Pyrenone pet shampoos
Pressurized horticultural sprays
Livestock emulsifiable sprays
Liquid roach and ant sprays
Pyrenone pet aerosols
Repellent cream
Dairy sprays
Liquid Pyrenone household insecticides
Food processing sprays
Pyrenone for insect-proofing packages
Pyrenone Dri-Die residual roach and ant sprays (pressurized)
Pyrenone industrial sprays
Pressurized cow sprays
Pyrenone and Dri-Die insect powders
Midget aerosols
Emulsifiable garden sprays
Garbage can sprays
Pyrenone wettable powder
Pyrenone-Rotenone horticultural dust
House and garden aerosols
Flea and tick sprays
Automated Pyrenone aerosol sprays
Non-toxic industrial space sprays
Moth proofing sprays
Pyrenone roach powders
Water-based nitrogen propelled pet sprays
Livestock face fly sprays
Rotenone emulsifiable fish killer
Synergized Rotenone fish killer
Emulsifiable grain protectant
Institutional sprays
Aerosol food plant sprays
Pyrenone and Dri-Die Pet Powders
Drosophila Dusts
Residual industrial sprays
Aerosol institutional sprays
Drosophila sprays
Area repellents
Aerosol industrial sprays

...is your product among these?

*Reg. U.S. Pat. Off., FMC
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***Reg. U.S. Pat. Off., W. R. Grace & Co.
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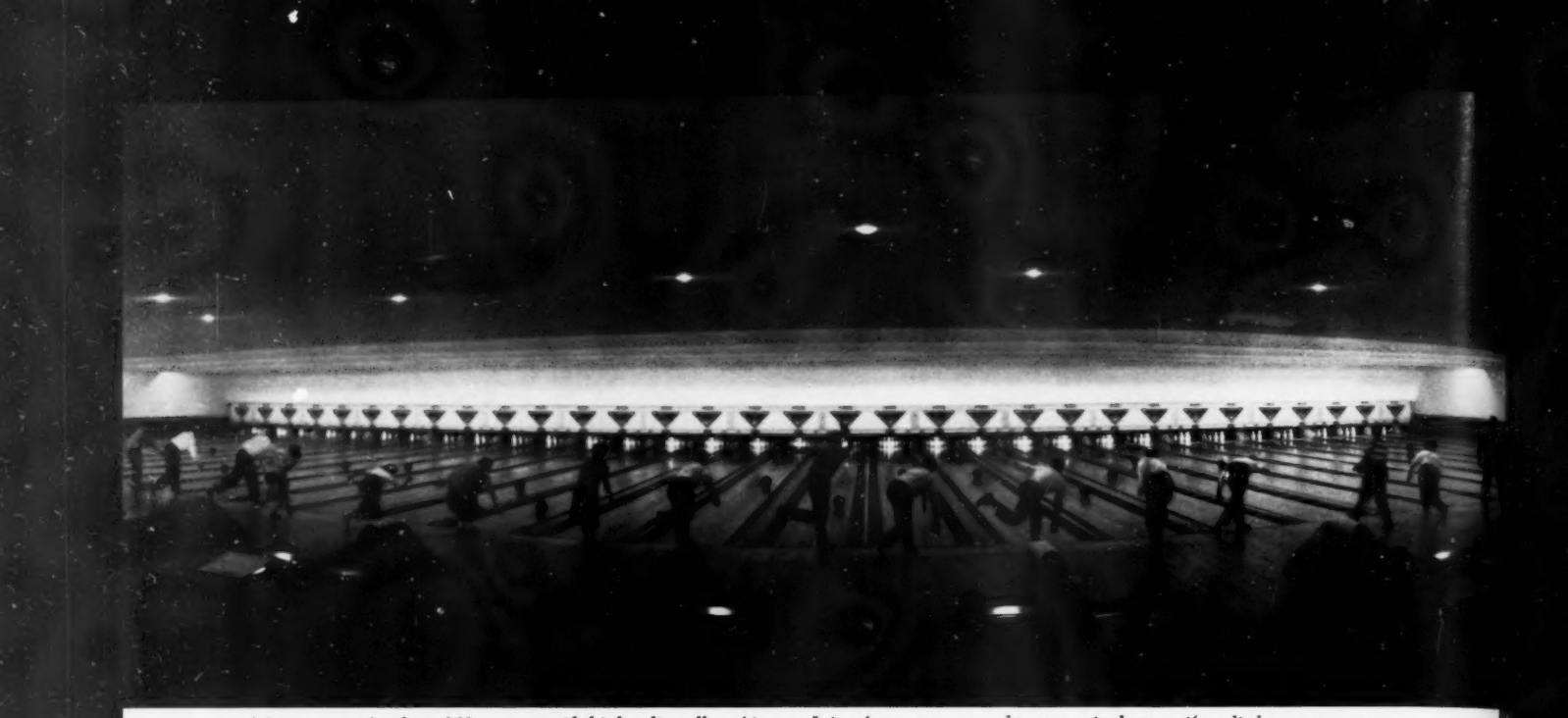

A few ounces of technical Vapona can rid this bowling alley of insects. It is safe to use—no need to stop a single game if applied as a coarse spray.

ANNOUNCEMENT:

A few ounces of remarkable new Vapona® Insecticide (technical DDVP) can make this 265,320 cubic-foot bowling alley free of annoying insects

Vapona is a new phosphate insecticide. It is highly effective against a wide range of public health insects. Very low dosages kill even resistant strains.

Read how new Vapona can be applied safely using standard equipment and techniques. And how you can start using it for more effective and economical control of insects.

New Vapona works differently than other insecticides.

In addition to killing insects on contact, it has a vaporizing effect. Insects can no longer avoid being killed by hiding in cracks, crevices and other hard to get at places.

Vapona knocks down and kills insects within a few minutes of application. Then, it disappears rapidly with ordinary ventilation.

Low cost

Vapona is applied at extremely low dosage rates. As little as ½ to 2 milligrams per cubic foot controls the toughest insects.

Because Vapona kills at such low dosage rates it is economical. It can do a better job of controlling insects for half the cost of many other insecticides.

Safe to use

Vapona offers safety in use. When applied as a coarse wet spray at recommended dosages, there is no need to wear a respirator. It is not necessary to evacuate inhabitants of homes, restaurants, stores and other public places while application is being made.

When fogging or mist spraying indoors, the building should be evacuated and the applicator should wear a respirator. Buildings should be ventilated before people are allowed to re-enter.

Vapona can be applied with all standard application equipment.

Available in 4 forms

Vapona Insecticide is available in emulsible concentrates and concentrated solutions for further dilution and in liquid and dry baits. Ask your regular supplier for Vapona Insecticide.

For more information, write: Shell Chemical Company, Agricultural Chemicals Division, 110 West 51st Street, New York 20, N. Y.

Control all these insects with Vapona

1. Flies	**8. Spiders**
2. Mosquitoes	**9. Silverfish**
3. Wasps	**10. Fleas**
4. Flying moths	**11. Fruit flies**
5. Gnats	**12. Phorid flies**
6. Cockroaches	**13. Other small**
7. Ants	**flying insects**

SHELL

Vapona®

Insecticide

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